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EDITORIAL

HOWEVER wide as measured by its subject, the world of philosophy, as measured by the number of those who are interested in it and by events other than the publication of new books, is a comparatively small one. Yet other things do happen which may be of interest to the readers of this Journal, and it is proposed from time to time to open numbers with a few paragraphs devoted to the record of them.

The outstanding event of the past year in England has been the Conference between the members of the old established *Mind Association* and the *Aristotelian Society*, which was held at Edgbaston in July under the Presidency of Leonard J. Russell, the Professor of Philosophy in the University of Birmingham. Beginning some twenty years ago with small attendances, these Conferences have grown steadily in size and importance, and form a valuable clearing house for the exchange of thought on the questions that are uppermost in current discussion. The papers themselves of the leaders are now published in an annual volume by the Aristotelian Society; and the present year includes discussions of "Substance and Process," "The Reality of Imaginary Objects," "What Philosophy can Contribute to Politics," "Whether Philosophers must Disagree," and "The Place of the *A Priori* in Knowledge." But the printed record gives a very inadequate idea of the scope and issue of these discussions, and many of the most interesting contributions came as usual in the course of debate.

In the ensuing year the main event in the philosophical world will be the International Congress, which after the usual interval of four years is to take place this year in the city of Prague, and will be of exceptional interest as an opportunity of exhibiting the solidarity of interest and the fraternity of mankind in the effort to

promote the progress of genuine philosophical thought. The main subjects of discussion will be: "The Philosophy of Nature and its Relation to other Departments of Philosophy"; "The Difference between Descriptive and Normative in the Social Sciences"; "Religion and Philosophy"; "The Crisis of Democracy"; "The Problem of Value"; "The Message of Philosophy." The Congress will meet on the second and continue till the seventh of September, and will be open to all without distinction of nationality. Any readers of PHILOSOPHY who desire to attend are asked to send their names to the Editor, who will forward them to the proper quarter.

Events on the Continent have a special interest for philosophers, as the more unfortunate side of them has had unsettling results in the lives of scholars in the department of Philosophy as in that of others. If this result has brought some of the most distinguished of them to reside at least temporarily in this country, these events are not, for us at any rate, without their bright side; and we venture to take this occasion to welcome them to England.

It was, however, felt that many would be unable to attend the International Congress at such a distance. Arrangements have accordingly been made to hold the Conference of the British Societies as usual this year in July, and the Committee has accepted the kind invitation of Professor Scott of the University of Wales in Cardiff for that occasion.

The Editor would like to remind readers of the Journal that its articles do not claim to be anything more than *discussions* of philosophical topics. There is nothing, therefore, to prevent such discussions being continued in the form of letters to the Editor, when occasion suggests further exploration of the topics dealt with.

MECHANISM, PURPOSE AND THE NEW FREEDOM

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THE problem of the relation between mechanism and purpose is of profound theoretical interest. It is the most fundamental of the great perennially disputed problems. And, unlike some other of the great unsolved problems, it is also of far-reaching and profound practical importance. The kind of answer we give to the question affects in a multitude of ways the conduct of our lives, the form and working of all our institutions, our science, our law, our politics, our economics, our morals, our religion.

Men of all periods have made use of explanations of two types, have postulated two different kinds of causation in their dealings with natural events. It has often been said that the primitive animist explains all events in terms of purposive causation. But it is not true; the statement is a libel on the intelligence of the savage. It is true that he gives to purposive action a wider rôle than we do; but also he assumes mechanical causation in all ordinary practical activities, as when he builds a house or a boat, makes and wields his tools. And at the other end of the scale, the nineteenth-century materialist, who in theory explained all events as the mechanical interplay of hard atoms, in practice recognized the reality of purposive causation in the conduct of his own life and in all dealings with his fellow-men; an inconsistency which reached its most amusing climax when T. H. Huxley, in his famous Romanes Lecture, exhorted us to defy the purely mechanical universe in the interests of morality and human welfare; or when Bertrand Russell, after eloquently expounding, as the principles of a free man's worship, the stoic acceptance of a strictly mechanical universe, of which every event, including all human thinking and activity, is strictly determined in every slightest detail for all time, appeared as a social and moral reformer, an advocate of nudism, free love, and the general principle of doing as you please.

These modern stoics are no whit less inconsistent than the stoics of antiquity, who, accepting a strictly determined mechanical universe, exhorted men to subdue their passions, control their natural impulses, and live according to reason. And, one may add, they are rather more inconsistent than the savage who in his treatment of his boat or his spear applies at one moment the mechanical, at another the purposive, principles of explanation and causation.

It is true that the development of science has brought a considerable restriction of the sphere of purposive causation and a corresponding extension of that of mechanism, with a more exact demarcation of the two spheres. The history of the process is familiar. It began with Democritus in the fifth century B.C., and culminated with the Darwinian revolution in biology. It was a series of bitter controversies in which, on the whole, the advocates of universal and exclusive mechanical causation gained ground, and in the end claimed, and to many minds seemed justly to claim, a sweeping victory.

Surveying this age-long controversy, the verdict must be, I think, that the defence of purpose was in the main badly conducted. It fell into the hands of metaphysicians and theologians; of the former the majority have capitulated to the attacking scientists; while the latter have continued the defence mainly on the ground of the evidences of design in the creation of the world. In this way there grew up the irrational groundless convention that science does and must recognize only mechanistic causation, while purposive causation is left to a minority of belated metaphysicians and to theologians defending a lost cause which they cannot afford to abandon. That brief statement characterizes, not unjustly I think, the state of this great issue in the last years of the nineteenth century.

I am concerned here to discuss the bearing on this question of the most recent developments of the sciences, and there can, I think, be no disputing the proposition that these developments make strongly for a revision of that *fin de siècle* position and for the re-establishment of purposive causation as an indispensable category of our thinking.

Before attempting such a brief survey, let me define the various ways in which purpose finds recognition in our discourse. Philosophers have discussed the problem of teleology as though teleology were a broader category than purpose, some making this claim explicitly. The most general evidence of teleology has always been the appearance of design in things; and appearance of design arises from the improbability that anything so complexly organized as the things in question should have arisen through the fortuitous concurrence of atoms or of physical energies working blindly, mechanistically.

But design implies purpose; therefore the Great Designer is assumed to have created the world with some such purpose as the realization of order, or harmony, or beauty. These two steps result in the Deistic theory which was so widely held by the men of science of the eighteenth century. Others went further along this road and adopted the anthropocentric theory; yielding to the egotism natural to man, they argued that the order and harmony and

beauty of the world were created in order that man should enjoy them.

For those who stopped at that position, the world of nature remained a purely mechanical system, all living creatures being machines of various degrees of complexity, and man merely the most complex machine of all, though a machine capable of contemplative enjoyment.

Such a theory may be called the theory of *initial teleology*; a better term, I think, than the one proposed by Professor Driesch, namely, 'static teleology.'[1] The mechanistic scientist has no serious quarrel with this theory. Such initial teleology seems to him harmless enough, for it leaves him a free field for the explanation and prediction of all events in mechanical terms. But the theologian and the common man have never been contented by initial teleology. The strong anthropocentric urge has carried them on to believe that the Creator has not abstained from all intervention with our world subsequently to the creative activity, to believe rather that he intervenes more or less to redirect its otherwise mechanical course. Thus the Creator becomes also the Great Engineer; and we have an *external contemporary teleology*. This exhibits three varieties: (*a*) that of the popular mind which sees the hand of God in all unusual events; (*b*) that which leaves the inorganic world to undisturbed mechanical causation, but sees the finger of God in the functioning of all living things; (*c*) that which restricts the teleological intervention to critical occasions in the mental life of men. All three beliefs are varieties of what may be called *interventional teleology*.

Another variety of teleology is that of the biologist who, seeing that many of the processes of living organisms (especially the processes of restitution of form and function after disturbance of the normal course) cannot be explained mechanically, postulates some unknown factor (utterly unspecified except as non-mechanical) which, steering the bodily processes towards their normal goal, keeps them true to the specific type. This, the teleology of many vitalists, may be called *neutral teleology*.[2]

Now it is certain that all these varieties of teleology derive from man's experience of his own purposive activities and from his belief that such activities (both his own and the similar activities of his fellow-men) are causally efficacious in the world of natural events. It is certain that men, if they had no such immediate awareness of and familiarity with their own purposive activities, would never have conceived any teleological explanations, and that all such terms as

[1] Cf. his *History of Vitalism*.

[2] In recent times it is represented by the 'entelechy' of the earlier writings of Professor Hans Driesch and by the special form of teleologically operating energy postulated by the late Eugenio Rignano.

design, plan, goal, function, efficiency, serviceableness, fitness, struggle, striving, effort, could have no meaning and could never have been evolved; and it is doubtful whether such terms as tendency, force, energy, causation, or any words expressing any valuation, whether positive or negative, could have meaning to a creature, conscious, but mechanical or mechanistic in its workings; a creature such as the biologists and psychologists of the Post-Darwinian period have commonly asserted man to be.

It is certain that man has conceived the Creator and Designer of the world after his own image, in the light of his knowledge of himself. It is certain that, if the purposiveness of human activity can be explained away as an illusory appearance, teleology of any kind becomes a groundless and utterly unjustified assumption, 'purpose' a meaningless word, mere *flatus vocis*; while religion and morality remain merely fanciful and illusory constructs of man's 'mythopoeic faculty.' To postulate teleology of any kind, anywhere and anywhen, while denying the reality and efficacy of purposive activity in man, is strictly absurd.[1]

I propose then to show very briefly, first, that recent developments of science have undermined the common objections of men of science to the full recognition of the purposive activity of man; secondly, that other recent developments provide increasingly strong grounds for such recognition.

Objections to Explanation in Terms of Purpose Undermined by Recent Developments of Science

The most general objection arises from a widely prevalent neglect to distinguish between the various forms of teleology defined above. The man of science naturally, inevitably, and properly dislikes interventional teleology in all its three forms; for the good reason that to accept such teleology is to admit that an indefinable proportion of phenomena are supernatural, and, therefore, by their essential nature, beyond the reach of scientific investigation and explanation. If the Creator frequently intervenes in the course of natural events to send us rain or sunshine, how can there be a science of meteorology? If earthquakes are expressions of divine or diabolic wrath, how may we hope to foresee them and to take due precautions? Further, the partial and increasing success of efforts to build sciences of meteorology and seismology affords good empirical support to this natural repugnance. Conversely, on the other hand, the dislike of all attempts to create a science of psychology (still widely prevalent in theological circles) is due largely to the fact that

[1] Yet this seems to be the position of Dr. L. J. Henderson in *The Order of Nature*, and of Dr. Joseph Needham in *Man a Machine*.

such attempts seem to threaten the last stronghold of interventional teleology.

Interventional teleology, so dear to the theologians, is the one kind of teleology that is logically incompatible with the spirit of science. While the theologian pins his faith to its reality, the man of science equally makes it a prime article of his creed that such intervention does not occur. This is the real crux of the long conflict between Science and Religion.

Science has no quarrel with initial teleology. So long as teleological activity is restricted to the creation of our world, the course of nature since that remote event remains a fair field for scientific explanation. And that is enough for the impartial scientist. The history of thought, from the later Stoics to Newton, Voltaire, Priestly, and in our own time, L. J. Henderson and Joseph Needham, shows how readily men of science may accept initial teleology. Why, then, are they so reluctant to recognize the causal efficacy of human purpose? Such recognition carries no more logical implication of interventional teleology, the natural bugbear of science, than does initial teleology.

One reason, psychologically effective though quite alogical, is that the recognition of human purpose, though it does not logically imply interventional teleology, does open the door to it as a possibility. Indeed, this possibility is the last stronghold of all religion in any vital and significant sense of the word. The reality of some intercourse between the individual human mind and some larger Mind is a vital assumption of all effective religion; and such intercourse implies interventional teleology. Hence human purpose becomes the object both of the cold dislike and suspicion of the impartial Scientists and of the iconoclastic fury of all those who harbour the anti-religious complex.

Closely allied with this most general but alogical objection to human purpose is another, equally influential and equally due to confused thinking. Science rightly seeks causal explanation of all phenomena; and the category of causation is the indispensable foundation of all science that seeks to go beyond the merely descriptive stage. Now there prevails among scientists the belief that all causation is synonymous with mechanistic determination. The history of the genesis and spread of this belief is a subtle psychological problem. It is clear that its prevalence is a modern development, one which is closely bound up with the Newtonian system and with the nineteenth-century delusion of the adequacy of strictly mechanical explanations of all physical phenomena. For under that system all causation was necessarily mechanical causation.

No doubt a considerable part in the genesis of this belief was played by Aristotle's account of causation in terms of causes of a

number of different kinds, among which final causes were one kind. For the expression 'a final cause' was commonly applied to the result achieved, or to be achieved, by purposive action. And it was asked, How can the result, an event still in the future, play a part in the causation of a present event? The notion is plainly nonsensical. Therefore away with final causes and every trace of 'finalism'! A main feature of the revolt against Aristotle which initiated the modern period of thought was this repudiation of 'final causes' and the growing traditional dislike of all thinking tinged with 'finalism.' Such is the unfortunate influence of 'terminological inexactitudes' upon our poor weak minds.

That this belief in the identity of all causation with mechanistic determination is still widely prevalent is shown not only by its explicit utterance by workers in many branches of science, but also by many implied assumptions of its truth. The assumption is implicit, for example, in the proposal of a numerous group of contemporary German psychologists to construct alongside of the established academic psychology (which they call 'scientific causal psychology'), a psychology of a very different kind to which they would give the name *verstehende Psychologie.*[1]

Whatever the exact history of this belief, it is clear that it is without logical justification. Though we may regret the language in which Aristotle discussed causation, we must follow him in recognizing, in principle, causation of two different types. On the one hand, we may properly conceive of causal processes which involve no reference of any kind to future happenings. All such events as are capable of explanation in terms of antecedent and contemporary events involve causation of this kind only. Such events and such explanations, even though not conceived in strictly mechanical terms, are conveniently called 'mechanistic.'[2] But we are perfectly familiar with

[1] Jung, Münsterberg, Erisman, Spranger.

[2] As I have pointed out in my *Modern Materialism*, the failure of universal mechanical explanation leaves us with no other meaning or possibility of definition of the word 'mechanistic,' a fact which seems to be recognized by very few of those who use the word. Such negative definition is not very satisfactory; and those who seek to find a more positive definition of the term 'mechanistic explanation' commonly offer some such phrase as 'the kind of explanation given by physics and chemistry.'

The mechanist position (as here distinguished from the strictly mechanical) is in high favour with the biologists especially. All the many adherents of what is called the organismic view belong to this group; all those who insist on the unity and wholeness of the organism; and all the many who have accepted the principle of 'emergence' as the key to hitherto incomprehensible properties of organisms. Here must be reckoned also most of the psychologists of the now so flourishing *Gestalt* school.

It is strange that no one hitherto seems to have attempted the synthesis of the kindred principles of emergence and *Gestalt*. The obstacle to such

events of a type in which reference to the future seems to play an essential role, namely, all our deliberately planned actions, every action in which we achieve some result which we have first conceived as a possibility of the future and have desired and striven to bring about or realize. All such successful actions are clear instances of purposive causation. They are the only kind of teleological event of which we have direct and intimate knowledge. To put aside such causation as not truly causation on any *a priori* ground is a perfectly arbitrary procedure; it is to be metaphysical in the worst sense. Yet it is just what is done by a multitude of men of science who profess the utmost scorn for metaphysics.

The question whether these two kinds of causation are ultimately distinct, or whether either of them may ultimately be shown to be a disguised form of the other, and, if so, which one is the more fundamental, which the illusory—that question is one which only the progress of science far beyond its present stage can answer. The hasty dogmatism, the gross confusion of thought, and the sheer unthinking ignorance with which this vital distinction is commonly slurred over, or obscured in favour of universal mechanism, is the greatest blot on modern science.

The confused thinking which identifies all causal explanation with mechanistic causation and puts aside purposive interpretation as non-causal is an instance of what the sociologists call cultural lag. Such identification seemed well founded and justified so long as the theory of strictly mechanical causation of all physical phenomena seemed tenable. But the rejection of that theory destroys all ground of such identification, and the continuance of that identification in the minds of so many would seem to imply a failure fully to accept or to understand the completeness of the breakdown of that theory. This lag would seem, then, to find its psychological explanation as an instance of wishful thinking, thinking motivated by a subconscious desire to retain a mode of thinking so congenial to the con-

synthesis seems to be the reluctance of the leaders of the *Gestalt* school to commit themselves to the recognition of the causal efficacy of psychical process, a recognition freely made by many of the emergentists: H. S. Jennings, W. M. Wheeler, and especially the neurologist, C. J. Herrick. Professor Lloyd Morgan, the arch-emergentist, hedges deplorably on this question, as I have pointed out in my *Modern Materialism*.

But to recognize the unity of the organism and even to suggest an explanation of the fact of unity by regarding each organism as one vast *Gestalt* or configurational field of energy, is not to solve all the problems of biology. Especially, all the facts of restitution of form and function after distortion, and, in only less obvious degree, all the facts of heredity and morphogenesis, remain recalcitrant to all mechanistic explanation, even when the organismic, the emergent, and the configurational principles are combined. As so rightly insisted by Professor Hans Driesch and other vitalists, they point to some teleological factor in the life of organisms.

stitution of our minds. Professor Bergson has rightly insisted on this congeniality, and leading physicists have not been slow to follow him. But the completeness of the renunciation of strictly mechanical explanation and the new freedom which it gives to our thinking require to be emphasized.

All the world knows that of late years physicists have recanted much of their dogmatism, especially their dogmatic denials founded on the clear-cut distinctions of the Newtonian system, time, space, mass, momentum. From the point of view of our topic the great change has been the admission that the strictly mechanical system of explanation, explanation in terms of the kinetic causation of moving masses, was hopelessly inadequate even in the sphere of pure physics. A second change, hardly less significant, is the breakdown of the clear distinction between matter and energy. These two closely allied changes bring with them the abandonment of the dogmas of conservation of mass, of momentum, and of energy. A third great change is the substitution of statistical probability for strict predictability and the abandonment of the dogma of strict determination of all events.

In brief, the great change, the great renunciation is the frank admission that the strictly mechanical system of explanation is untenable.

Of course, it always was untenable. The change is a giving up of a convention which may have been useful in a limited way, but which was made to seem generally true and to be the solid ground of various dogmatic denials only by obstinately turning a blind eye towards many natural phenomena. Einstein has not really changed the nature of the universe, as the language of many physicists might seem to imply. He has changed only the physicist's ways of thinking about the world, has shown the inadequacy of a way of trying to explain natural phenomena which for some centuries had been conventional among physicists, a way which had been even more fanatically followed by the many philosophers and the many students of other branches of science (especially the biologists and the social scientists), who have been unduly dominated by the immense prestige of the physicists. Many of these still cling pathetically to the negative implications of the abandoned mechanical theory, like drowning sailors to a fragment of wreckage.[1]

[1] It was surely always obvious to the more impartial thinkers that the strictly mechanical system of explanation was not applicable to such facts as the chemical affinities and properties of elements and compounds. When I was an undergraduate student of chemistry we used to think of the atoms of a molecule as linked together with little hooks which were represented on the blackboard by short straight lines. But no one, I suppose, took these mechanical symbols very literally; and we talked about forces of attraction and repulsion exerted by the atoms upon one another, forces which were

The great renunciation, the repudiation of the strictly mechanical system of explanation as adequate to all events, is now thorough and complete. But among the physicists (as among other thinkers also) we must distinguish two groups, namely: on the one hand, those who recognize that the great renunciation leaves room in nature for the recognition of the causal efficacy of purposive activities; on the other, those who still reject purposive activities as anathema, as outside the realm of nature, as supernatural or non-natural events and therefore in some sense unreal.[1] The scientists

supposed to act very powerfully across small distances. I remember also that in the pre-relativity and pre-quantum period a physicist of high standing, Wilhelm Ostwald, secured widely diffused interest in his proposal to overcome scientific materialism by abolishing matter altogether, substituting for it a great variety of forms of energy, among which were mental or physical energies (*Vorlesungen über Naturphilosophie*, Leipzig, 1902).

"I believe," writes a modern physicist, "many will discover in themselves a longing for mechanical explanation which has all the tenacity of original sin. The discovery of such a desire need not occasion any particular alarm, because it is easy to see how the demand for this sort of explanation has had its origin in the enormous preponderance of the mechanical in our physical experience. But nevertheless, just as the old monks struggled to subdue the flesh, so must the physicist struggle to subdue this sometimes nearly irresistible, but perfectly unjustifiable, desire. One of the large purposes of this exposition will be attained if it carries the conviction that this longing is unjustifiable" (Professor P. W. Bridgman in *The Logic of Modern Physics*, New York, 1928). It may be added that the psychological root of this illegitimate longing is the fact that all our own causal activity directed upon the world about us, both animate and inanimate, seems to be (with certain possible but rare exceptions) exerted by moving parts of our bodies and, by means of such movements, communicating motion to other things. If it were common experience to communicate with our fellows telepathically or to ignite fire or to initiate other chemical changes by direct volition, the mechanical system would never have enjoyed exclusive favour. The reading of Professor Bridgman's book strongly suggests the need for a companion volume on the psychology of modern physics.

[1] Prominent among the former group (the smaller, I imagine) are Eddington and Jeans. The latter writes: "The fact that 'loose jointedness' [William James's favourite appellation] of any type whatever pervades the whole universe destroys the case for absolutely strict causation, this latter being the characteristic of perfectly fitting machinery." And: "Although we are still far from any positive knowledge, it seems possible that there may be some factor, for which we have so far found no better name than fate [why not 'purposive activity'?] operating in nature to neutralize the cast-iron inevitability of the old law of causation. The future may not be as unalterably determined by the past as we used to think." Again, after showing that a mechanical universal ether is impossible, he writes: "We are compelled to start afresh. Our difficulties have all arisen from our initial assumption that everything in nature, and waves of light in particular, admitted of mechanical explanation; we tried in brief to treat the universe as a huge machine. As this had led us into a wrong path, we must look for some other guiding principle." And yet again: "The picture of the universe presented by the new

of the latter group (which includes many biologists and psychologists) incline to be scornful and resentful of the former, as of colleagues who have abandoned to the enemy the very citadel of science. Although they admit (under compulsion) the inadequacy of strictly mechanical explanations (explanations in terms of the momentum and impact of masses), and though they recognize that perduring particles of matter in motion are not necessarily assumed in all explanations of events, they still stoutly repudiate purposive or teleological activity as a natural process having causal efficacy. And even such a chemist as L. J. Henderson, who elaborates a powerful argument for initial teleology (for design and purposive direction in the creation of our world), continues to deny all causal efficacy to purposive activity in our contemporary world.[1]

Such repudiation of the strictly mechanical explanation, combined with refusal to recognize the efficacy of purposive activity, constitutes what may conveniently be designated the 'new materialism.' It seems to be the position held by the majority of contemporary men of science.[2]

Yet it lacks the respectability of the mechanical theory. The latter, though untenable, was logically consistent; its denials followed

physics contains more room than did the old mechanical picture for life and consciousness to exist within the picture itself, together with the attributes which we commonly associate with them, such as free-will and the capacity to make the universe in some small degree different by our presence. For, for aught we know, or for aught that the new science can say to the contrary, the gods which play the part of fate to the atoms of our brains may be our own minds. Through these atoms our minds [our purposive strivings] may perchance affect the motions of our bodies and so the state of the world around us. To-day science can no longer shut the door on this possibility; she has no longer any unanswerable arguments to bring against our innate conviction of free-will." To which it may be added that she never had any such arguments, a fact which seems to escape both Eddington and Jeans. These passages are cited from *The Mysterious Universe*, New York, 1930.

Similarly Eddington says in a recent address: "His [the physicist's] first step should be to make clear that he no longer holds the position, occupied for so long, of chief advocate for determinism, and that if there is any deterministic law in the physical universe he is unaware of it." (Presidential Address to the Mathematical Association, 1932.)

[1] *The Order of Nature.*

[2] This position I have discussed at some length as *modern materialism*, the present day successor to strict or literal materialism, in my *Modern Materialism and Emergent Evolution* (London and New York, 1928). Some confusion arises from the fact that some of the scientists who hold to the new materialism use the word 'mechanistic' as synonymous with 'mechanical'; hence they repudiate what they call the 'mechanistic theory' (meaning the strictly mechanical) while refusing to recognize the causal efficacy of purposive activity. This is not a third position; it is merely a variety of *the new materialism* (as defined above), and might well be called *crypto-materialism.* It is the position of the leaders of the *Gestalt* school of psychology.

logically from its assumptions. The *new materialism* perpetuates many of the same denials (hence the justice of the designation here proposed) merely by reason of mental inertia, the tendency to continue thinking in old ways whose logical foundation has been destroyed.

Let us clearly recognize that there are only two logical positions in this great issue of purpose and mechanism. You may recognize the validity of both mechanistic and purposive explanations; or you may deny one or other of them. There is no third type of causation or causal explanation in question; no third type has been suggested. The new materialism has no logical standing.

Recent Developments of Science demanding and justifying the Recognition of Purposive Causation

We have seen that reluctance to recognize the causal efficacy of purposive activity has characterized science throughout the modern period; that its chief ground and only logical justification was the belief in the universal adequacy of the Newtonian mechanics to explain all natural phenomena; that with the great renunciation of that belief, the reluctance, though now without logical foundation, persists widely among men of science. What then of the empirical grounds for the acceptance of purposive activity? It is naturally in the biological and more especially the human sciences that we may expect to find such grounds. We can hardly expect that the physical sciences shall provide clear empirical evidence of this kind.

It is necessary to be clear about the logical and epistemological principles involved. And here I can only frankly assert the exclusive validity of the pragmatic principle. In interpreting natural phenomena we form hypotheses; when we find that an hypothesis will not work, we must reject it; when we find one that works well, we call it a theory; and the larger the number of groups of natural phenomena for which it provides satisfactory interpretations, the stronger its claim to be regarded as a true theory. There is no other kind of scientific truth, no other meaning to be given to the words.

I pass over the biological sciences other than psychology, merely pointing to the facts that an increasing number of biologists are repudiating mechanical explanations, recognizing the need for explanations of some other type—the organicists, the emergentists, the configurationists, the neutral vitalists, the psycho-vitalists (such as August Pauli, E. Rignano, and E. S. Russell), and the idealists (such as J. S. Haldane).

In this great problem, as in so many others, psychology is the key science. Psychology during the nineteenth century sought to build itself after the model of the physical sciences with their atomic

theories and their exclusively mechanical causation. There is still no one science of psychology, but rather the psychologies of many schools. But the outstanding feature of psychology in the twentieth century is the increasing recognition of the uselessness of mechanical or mechanistic psychologies, and the consequent pragmatic demand for and increasing influence of the psychologies which make use of purposive interpretation. We see the rapid spread of the psychologies of Freud, of Jung, of Adler, and of other psycho-analytic sects, all of which are fundamentally purposive (although Professor Freud has needlessly, illogically, groundlessly, proclaimed his adhesion to the deterministic principle). We see the same revulsion against mechanism in the school of *Gestalt*, of which, while some members still hesitate and hedge, others, such as Professor R. H. Wheeler and (less frankly) Dr. Kurt Lewin, plump for purpose. We see it in Professor William Stern's system of Personalism. We see it in the proposal for a *verstehende Psychologie*. We see it in the closely similar demands of German students of the social sciences for a *gesiteswissenschaftliche Psychologie* distinct from the mechanistic psychology traditional in the universities. We see it in the latest publications of Professor E. L. Thorndike, long regarded as a great champion of the mechanistic psychology. We see it even in avowed behaviourists, such as Professor E. C. Tolman, who in a recent book elaborates what he strangely calls 'a purposive behaviourism.' We see it in the last book of the late Hugo Münsterberg, published just before his death during the war, in which he recognized that mechanical psychology, though strictly 'scientific,' is a perfectly useless and artificially distorted account of human life; a recognition which led him to write two psychologies in one volume, a mechanical in the first half, a purposive in the second.

In short, it is increasingly recognized that the long-sustained efforts of many psychologists to find a mechanistic explanation of the simplest adaptive or intelligent actions of men and of animals have failed; and that we can only begin to understand them when we recognize them as instances of striving towards a goal, striving, directed by foresight of some kind and degree and influenced by feeling. The workers in the psychological laboratories are everywhere concerning themselves with problems of motivation, of incentives, goals, drives, determining tendencies, valuations.

I turn to the historians, and here I must be content to give you in a few words the substance of an address by Dr. Charles A. Beard which I recently was privileged to hear. Dr. Beard told us how historians, after being dominated by the ideal of a strictly scientific history based on the assumptions of strict determinism and mechanical causation, have at last realized that such history is utterly unsatisfying and unreal, that, if its fundamental assumptions are

true, such history is perfectly useless and not worth the trouble of writing it. As he put it, the historians are admitting that they must make history philosophical rather than strictly scientific; he even seemed to suggest that it must become theological once more. All of which is, I venture to suggest, essentially the recognition of the need for a scientific basis of a different kind, a science of human nature, a theory of man, which shall recognize the efficiency of human activities rather than one which represents man as a mere machine, the helpless sport of his environment. In short, the historians, like the psychologists and the workers in the various social sciences, are finding that the mechanical theory of man does not work; that it has led them into a blind alley from which they must return in order to reach the road of progress.

Two pragmatic tests of the mechanical theory of man are in progress on a vast scale. One is the educational system of the United States of America. The other is the attempt of the Russian Soviets to build up a new and better society on this theoretical basis. It is still too early to claim positive evidence from either experiment; but some indications that the theory is not working well are already discernible in both cases.

Finally, I turn to the economists and practical men. Since Adam Smith taught the great principle of *laissez faire*, that principle has prevailed; and indeed logic, as well as capitalism, was upon that side. For whether the beautiful harmony and automatic self-regulation of the economic system in a purely mechanical world was attributed to the design of the Great Architect or to the felicitous operations of natural selection, the practical consequence was the same. Let man accept the universe as it was, including its economic aspects; for indeed, if he was but one bit of mechanism among the rest, he could do no other. And so, economic Man, fortified by the approval of mechanical philosophy, ethics, psychology, and history, gave unrestrained expression to his natural greed and grabbed all he could, under the one great economic law—the Devil take the hindmost. The economist's function was merely to contemplate this part of the universal mechanism, to describe its iron laws and the merciless grinding of its iron wheels; while deprecating those occasional joltings of the economic machine which made a minority of us somewhat critical of its alleged perfections.

And now a bigger jolt than usual has made us all sceptical of the doctrine that man is powerless to direct the course of his own activities, has made us even begin to see that the mysterious economic forces, of which the text-books so long have prated, are nothing other than the desires and aspirations of men. On every hand we hear the demand for economic planning. But, as recently I heard Mr. Norman Thomas insist in an eloquent address, planning is not

enough. Before we can rightly plan, we must clearly define our purpose. Planning is but finding a means to a goal. Our common goal must be defined and our common purpose to attain it must be firmly set. Then, if only we can completely throw off the paralysing belief in the mechanical doctrines, we shall go forward to furnish the convincing and final pragmatic demonstration of the causal efficacy of human purpose. Fortunate indeed is the American nation in that it has found and is following a leader who brushes aside all mechanistic sophistry and displays his firm conviction that, through clear and resolute purposing, wise planning and vigorous action, man, collective man, may make himself master of his destiny.

SOME POINTS IN THE PHILOSOPHY OF PHYSICS: TIME, EVOLUTION AND CREATION[1]

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WHEN I agreed to lecture to-night I stipulated that I might be allowed to interpret the subject announced so as to let my treatment relate less to the subject in general than to some particular aspects which happen to have been interesting me lately. Professor Whitehead, Sir Arthur Eddington, and Sir James Jeans have given to the world brilliant accounts of the present position of physics in relation to mathematics and philosophy. What I have to say bears to their writings, the humble relation of an example to a piece of book-work, or of an application of a theorem to the theorem itself.

The particular subject to which I invite your attention is that of time and space, more particularly time, in relation to relativity and thermodynamics, and the time and space of the whole world. The present position in physics of time seems to me to offer difficulties, and it may interest you if I attempt to discuss them to-night —for a "short space of time," whatever that may mean!

Strictly speaking, physics has no philosophy. It has method. At any rate physicists, both theoretical and experimental, are rarely philosophers when they are making investigations, but they are acutely conscious of method. Philosophy concerns itself with the justification of these methods, and the ultimate meaning in reality of the results obtained by the methods. Now the methods of theoretical physics seem to be reducible to two species, the method of starting with concepts and the method of starting with things observed. To start with a concept requires two people who agree that they understand what the concept means without giving it an exact definition. They agree that the concept is an entity which, for each of them, stands in the same relation to the things and propositions which are to follow. In some presentations of thermodynamics energy is introduced as a concept; in Sir James Jeans' recent book, *The New Background of Science*, space and possibly even electrons and protons are regarded as mental concepts, though with respect to the latter most physicists would disagree with him.

When a subject is developed from concepts the concepts play the part of the terms occurring in the axioms of geometry. It may be convenient to have some sort of idea of what the concepts stand

[1] An address delivered to the British Institute of Philosophy on October 17, 1933.

for, to give crude illustrations of them, as for example when we make to ourselves a crude picture of a geometrical point or line. But actually no use is made of these crude illustrations. The concepts are undefined save as being governed by propositions of which they are subjects. To say of energy that it is that which is conserved in processes of certain types takes us no further in understanding what energy means, nor has the proposition any content unless a measurement process is specified by which conservation can be tested. As Mr. Bertrand Russell remarks in an oft-quoted sentence, the upshot of this is that (in geometry for example) mathematicians do not know what they are talking about and do not care; they do not care because to care would be irrelevant.

In the other method of procedure, a synthetic process is followed. Things experienced or observed come first, and then combinations of these are constructed which have such aspects of generality that they give insight into the relations between the things observed. The things observed lead to generalizations which involve terms with an observational meaning, and these generalizations sum up many possible observations.

Physical science in its theoretical development tends, not to oscillate between the two methods, but to replace the first method by the second. The method of concepts often requires the greater imagination and the deeper insight to isolate the concepts which are to prove useful. But it is more primitive. In a way, it saves trouble. The method of defining each term in terms of things already observed requires much painstaking analysis. But it has the ultimate merit of avoiding the unnecessary. The method of concepts affords no test as to whether the concepts are essential. Indeed, the method of concepts is a matter of mental economy, but not of logical economy. It is a pioneer method, without which progress would be often slow or impossible. Concepts wisely chosen lead to discoveries, to phenomena previously unsuspected. Often the conceptual character disappears of itself, when things introduced as concepts become objects of observation. At other times unnecessary concepts are only bundled out by a great revolution in thought. The atomic theory of matter and the dynamical theory of gases both started with concepts, the concept of atomic entities of different species and the concept of these atomic or molecular entities in motion interacting dynamically with one another. The atomic theory of matter was not implied by the rules of chemical combination—the conservation of mass and the existence of combining ratios and so on —but was nevertheless a grand tool of investigation before individual atoms were observed. The dynamical theory of gases led to relations between observable quantities, like Maxwell's prediction of the independence of gaseous viscosity of pressure, subsequently

verified. In each case the starting-point was a superb effort of the imagination. Rutherford's discovery of the atomic nucleus led to Bohr's magnificent conception of atomic structure as involving discrete electronic orbits about a centre, and Bohr's theory opened up the possibility of unravelling the spectra of the elements and predicting their chemical properties.

Electronic orbits were a hypothesis. Was this a necessary hypothesis? In 1925 Heisenberg answered this question by passing to the other method of theoretical physics the method of introducing nothing but "observables," to use Dirac's word. Abandoning the mention of orbital sizes and frequencies, Heisenberg showed that the transition relations beween the observed energy levels in atoms could be obtained by starting from these levels alone.

This great revolution in thought led to the foundation of the quantum mechanics. But it was not a revolution in method. In 1905 Einstein had applied the same method to the notion of simultaneity of events. He showed that when we examine simply the observations which it is possible to make by which we habitually assign epochs to events, then two events which appear to be simultaneous to a given observer are not in general simultaneous to a second observer in uniform motion with respect to the first observer. Einstein swept out of tenability the concept of an absolute simultaneity, previously uncritically accepted as intuitive. Einstein's method was to tie an observer down to stating his tests for what he was disposed to call simultaneity; unless he came prepared to state tests for simultaneity, a judgment as to the simultaneity or otherwise of two distant events was valueless. It was this necessity for concentrating on evidence, which Einstein forced physics to take into account, that has had so profound an effect on the development of physics. It is true that the statement made above, concerning an observer in uniform motion with regard to a second observer, involves a conventional assignment of epoch to an event, and involves further a definition of uniform velocity, which in turn implies a definition of distance and a definition of uniform time. The definition of distance employed by Einstein involved the introduction of the concept of the rigid body, which cannot be defined, so that Einstein's treatment was not free from conceptual taint. We shall later endeavour to avoid such departures from the purely observational method. Nevertheless we may with Jeans speak appropriately of the "Einstein-Heisenberg policy" of concentrating only on observables, and regard the fact that this policy is not only practicable but amazingly successful as one of the discoveries of the century.

Once an unnecessary concept is dismissed it does not return. Nevertheless, new different concepts may then make their appearance. Heisenberg's discoveries were quickly followed by Schrödinger's

development of the wave-mechanics, which presented a new unobservable ψ, the subject of mathematical propositions but not otherwise defined. Certain aspects of ψ—its absolute magnitude, for example—had physical interpretations and were equivalent to physical measures, but ψ itself remained mysterious. Dirac, in his profound volume, has constructed a complete mechanics which begins by introducing a new set of concepts, not defined in terms of immediate experience. Certain non-numerical magnitudes typified by symbols ψ (or ϕ) and α are introduced as representing "states" and "observables" respectively where a distinction is made between the "observable" α and the number that is obtained when an observation of this observable α is made on the system in the state ψ. Thus the state and the observable are conceptual things, capable of being roughly described but not defined or directly experienced. A purely symbolic mathematics is then constructed on the basis of defined operations between observables and states, and formulae are obtained embodying the fact that under certain circumstances observations assign definite numerical values to observables. Probability interpretations are then placed on certain symbols, capable of a meaning whatever systems or observations are in question. Next, in a most beautiful manner, the equations of classical mechanics are used to suggest relations between observables which are cases of the general abstract theory, and thus certain operations conducted on them are capable of interpretation. Lastly, the constructed abstract theory and the introduced abstract mechanics are applied to particular physical systems, themselves involving such concepts as the point-mass and the point-charge, and the predicted properties of these specific physical systems can then be obtained from the interpretation of the abstract relations. This imperfect summary is only intended to illustrate the development of physics by the successive use of old concepts, then things observed, and then in turn new concepts, the last being possibly very strange ones.

Though the Einstein-Heisenberg policy is fairly new to physics, it is far from new to philosophy. This was the policy of Locke and Hume. Hume in particular irrevocably damaged the idea of efficient causation by examining the evidence by which a particular "cause" was assigned to a particular "effect." Though we may not accept his solution in terms of habit, we owe a great debt to his exposure of certain fallacies of thought; the philosophy of physics considered as a method is in fact the philosophy of Hume. Again, modern logic, in the works of Whitehead and Russell, is the fearless eradication of things that cannot be observed. The theory of number, both of finite number and of infinite number, is the strict application of such a simple experimental process as that of counting objects.

It is in the domain of microscopic phenomena that the successes of modern physics have been most conspicuous. I should like now to invite your attention to the application of the methods of physics to the less fashionable domain of macroscopic or ordinary-scale phenomena, and to discuss these in relation to certain large-scale phenomena. It is often said that the concepts of space and time may break down in atomic phenomena. But it is no use saying this unless we are clear as to what these concepts mean in larger-scale phenomena, indeed until we are certain that they are only concepts. For example, in order to be able to attach a meaning to the uncertainty principle of Heisenberg we have to give form to the notions of position and momentum, of energy and time, which involve both kinematical and dynamical notions; and the principle implies the transfer to atomic phenomena of notions derived from ordinary experience.

Now there are two well-defined branches of physical science which concern themselves with the macroscopic phenomena. One is the theory of relativity, the other is thermodynamics. Both of these bring us immediately to *time*. The one makes little of time, the other makes much.

The one, relativity, appears to relegate time to the rôle of a co-ordinate. It is often represented as claiming to show that time and space, not separately real, are but aspects of a higher reality, "space-time," which is the true framework of events. The individual is supposed to make his private choice of his resolution of this frame-work into his own separate space and time, but no one choice is to be preferred to any other. An individual observing two separated distant events may describe one as preceding the other, whilst another may describe them as simultaneous. The time-ordering of the events thus depends on the particular observer, and has nothing to do with the events themselves. As Jeans points out in the book mentioned, this raises acute difficulties concerning the reality of evolution. He mentions that it has been suggested that "the concept of evolution in time may lose all meaning," so that we cannot speak of the universe evolving as a pattern is woven on a loom. If "time is merely a geometrical direction of our own choice in a continuum," the pattern is already spread out, and future events have the same kind of reality as past ones. "Indeed, an inhabitant of a nebula can wave his 'now' through the continuum until its intersection with the world-line of our path passes instantaneously from 1932 to 1942." In fact the theory of relativity does not imply that the observer on a distant nebula can experience or observe the event, near ourselves, which we shall experience in 1942, at an epoch defined by an event occurring in our reckoning as 1932. In the definite meanings it is possible to attach to the words, we shall

experience the events of 1942 sooner than anybody else can have experience of them. We ourselves are first in the field. But the evolution difficulty still remains. If time means different things for two different observers, how can the universe be said to evolve in time? For no meaning can be attached to a unique temporal ordering of the totality of events.

Yet there is one characteristic of the world frequently adduced to show that it is indubitably evolving. That characteristic is an apparent steady increase of entropy. As each observer's time goes on, the universe appears to him to be moving from a less probable state to a more probable state; it appears to be tending to a changeless state, of uniform temperature, a state called "heat-death" in which all available mechanical energy has been transformed into forms not available at this final constant temperature. In a section called "The Final State of Maximum Entropy," Jeans says that though general considerations cannot indicate the road by which the final end of the universe is reached, they can tell us something as to the nature of this final state. Though the entropy *might* decrease momentarily, this is enormously improbable, and it is still more improbable that it should go on decreasing for any measurable period. Jeans draws explicit attention to the fact that his examples of change of entropy are confined to finite portions of the universe, such as a boiling kettle or red ink mixing with water, but he applies the same conclusions to the whole universe. "There can be no end to the increase of entropy until these regions [regions of the universe at different temperatures] are all at the same temperature, with radiant energy diffused uniformly through space. Then and only then will the universe have reached its final state, the perfect quiet and perfect darkness of eternal night."

Thus we have the two results: relativity suggests that the flux of time is meaningless, whilst thermodynamics suggests that it is highly significant. These are contradictory. If there is a limiting state of the universe to which we are approaching, then states that are old can be distinguished from states that are young, by the degree of their approximation towards the final state. Not only distinguished, but labelled the one old and the other young. But according to relativity different observers assign different times to different events. Which time is the one indicated by thermodynamics? Does thermodynamics indeed select a special time, which we could call absolute time, and if so what observer experiences this time? Thermodynamics appears to say that the system is ageing to *all* observers; it does not keep company with relativity. It is not sufficient with Eddington to say that the entropy-increasing property gives a point to time's arrow. It is not merely a question of the time-sense, the fact that entropy distinguishes one direction

of time from the other; it is that the interval between two states of the universe, corresponding to a given entropy difference, may apparently be different for different observers.

Jeans does in fact conclude that there is for the world an absolute time, though he derives this not from thermodynamics but from the structure of the astronomical universe. His view is that absolute time and absolute space exist in a wider external world than that of pure physics, that this absolute space and time are found in astronomical nature, and that so an escape may be found from the relativity-view that evolution is meaningless.

It appears to me, however, that Jeans evades the issue. By astronomical nature he means very large-scale phenomena, the outward motions of the spiral nebulae, and his conclusion would be solidly based only if these phenomena disclosed something which contradicts those conclusions to which we have been led by laboratory experiments. Jeans says that absolute time and absolute space do not enter into the nature we study in our physical laboratories. But how? In what sense can a large block of space be absolute whilst a small one is not? If the universe contains an absolute frame of reference, it must also be absolute whatever the scale of the phenomena. We cannot, of course, rule out the possibility that very large-scale phenomena might disclose generalizations not found to be valid for smaller-scale experiments. But Jeans is talking not of phenomena but of time and space, elsewhere considered as "mental concepts." And which large-scale phenomena are in fact the culprits? But there is another point. The second law of thermodynamics *is* verified for ordinary-scale phenomena, so that even for ordinary phenomena we have the apparent conflict between relativity and thermodynamics. Jeans says: "Through our consciousness we break up the space-time product into space and time, whilst electrons and radiations and protons cannot." Yet it is not suggested that it is due to our consciousness that that aspect of evolution which we call the entropy-increasing property does actually exist. These same electrons and protons which cannot break up space-time into its constituents are the very participants in the drama of the ultimate heat-death. In spite of relativity, therefore, they know how to behave as if a definite time exists. Jeans is even led to conjecture that "our minds may be in contact with reality by other than purely physical elements," just because of their consciousness of "a radical distinction between space and time which does not appear to extend to physical phenomena." Yet he emphasizes an apparently fundamental distinction between time and space when he describes that physical phenomenon which is the running-down of the universe.

I want now to suggest that the impasse arises partly from our forgetting the purely conceptual character of space-time and partly

from an unjustifiable application of the second law of thermodynamics to the whole universe. Our experience of time is immediate, not a concept; the experiments on which thermodynamics is based are not concepts. But on the one hand "the whole universe" is a concept, as de Sitter has pointed out, save in the case of the uninteresting possibility that the universe contains a finite number of particles. And on the other hand space-time is a concept of which we have no experience, a mathematical invention, useful solely for correlating experiences. We have no right to foist this invention on nature and then complain that nature contains two contradictory phenomena; for the so-called possession of a space-time framework in which time and space merge together is not a phenomenon in nature. Our problem is to correlate the experience of one observer (in which, in his time, the universe increases its entropy) with the experience of another observer with a different time. Jeans is, I think, right in suggesting that very large-scale astronomical phenomena afford a means of reconciling these experiences, but not, it seems to me, by pointing to a unique or absolute space or time, which involves grave difficulties in relation to the facts on which relativity is based. We will attempt to remove our difficulties by building up definitions of space and time, or rather building up measures of space and time, from a basis of things experienced. We will pass from concepts of space and time to observables, according to the Einstein-Heisenberg policy.

We begin with the observer. Each observer possesses, for macroscopic phenomena, a definite temporal experience of events at himself. I as an observer and chronicler can say of two events which happen to me which precedes the other. For very small separations of events it may, indeed, occur that I am unable to decide which is earlier, and the indubitability of the time-sequence may fail. But this is not an exception in principle. I may suppose myself to have constructed a clock, running no matter how irregularly, and to have graduated it numerically in some perfectly arbitrary way. I can make the graduations as small as is recognizable. Then when an event occurs to me I can prick off on the clock-disc the position of the hand, and so attach some definite time-number to the event. There is no question of my "resolving my experiences into time and space"—there is no arguing about my own temporal experience. We remark further that the only events the observer actually experiences are events at himself. He may be informed of other events, or infer their existence from his own experience, but he has direct experience only of events at himself.

The observer, myself, is quite unable to superimpose two different intervals on the clock. Once gone, an interval on the clock is gone for ever. Thus from my own experience alone I cannot select one par-

ticular system of graduation of my clock subdivisions and call them "uniform time." So far uniform time is not definable.

I have certain experience of the relative proximity of objects near me, namely tactual experience. I can extend my arm, and ascertain that I have to extend it more for one object than for another. I can also walk to an object, and count my paces. But it would be difficult to build up consistent measures of "distances" of objects from these observations. If, on the other hand, I use a metre scale, and read off positions of objects against its graduation, either I assume its graduations are equal or that the scale itself is unaltered by displacement—in each case invoking the indefinable concept of the rigid body. As we are endeavouring to proceed without using indefinable concepts, we must exclude the use of the metre scale.

The assigning of a distance to a distant object can be accomplished in principle as follows: I can send a signal (*e.g.* a light-signal) from myself to the object, despatching it at time t_1 by my arbitrary clock. I can then receive back the echo, and note the time of its arrival, say t_2. If necessary I can arrange another observer at the object who returns my signal immediately he receives it. The position now is that I have two data of observation, t_1 and t_2. What can I do with them?

Out of two numerical magnitudes two other independent numbers may be constructed in an infinite number of ways. I want to construct two numbers, one of which I can call the epoch of the event constituted by the arrival of my signal at the object, the other of which I can call the distance of the same event, *i.e.* the distance of the object at the instant of occurrence of the event. Though the epoch of an event occurring not at myself is completely undefined, so far, it is clear that it will be convenient to assign to this event an epoch or time-number which is greater than t_1, the epoch of despatch, and less than t_2, the epoch of return. For in any sense we can reasonably attach to "earlier" and "later," the event is later than t_1, earlier than t_2. Let us adopt as a purely conventional definition of the epoch of the distant event the average of t_1 and t_2, say T. Thus $T = \frac{1}{2}(t_1 + t_2)$. The event is then said to be simultaneous with the event constituted by my clock-reading T. This is a purely conventional definition of simultaneity, but it is compatible with any intuitive ideas we have as to the meaning of simultaneity, provided we could attach a meaning to saying that the clock was running uniformly and the signal travelled at constant velocity. In fact this conventional assignment of an epoch to a distant event is sometimes said to involve the assumption that the forward and backward signal velocity are the same. But we have not yet defined "distance," hence we have not defined velocity, so the limitation

would be meaningless. We content ourselves with the epoch T as defined with reference to the arbitrary clock employed.

Having averaged t_1 and t_2, the simplest remaining thing to do is to subtract them. For technical reasons, it is convenient first to choose an arbitrary number, c, and then define the distance of the event as $\frac{1}{2}c(t_2 - t_1)$. This we will call X. In ordinary language we should say that c is the signal-velocity, so that $c(t_2 - t_1)$ is just the distance described in the double journey. But in our presentation c is just an arbitrarily chosen number. We have now defined distance X without using a rigid-scale. We have used only clock-measures made with an arbitrarily graduated clock.

If we wish to assign measures to the relative direction of two distinct objects, we can measure the angles between their directions with the aid of a rigid body equivalent to a theodolite. It should be noticed that the use of a rigid body for measuring angles is fundamentally different from the use of a rigid body for comparing lengths; the right angle and its subdivisions are *communicable* units, capable of being set up independently, whilst the metre is not a communicable unit. I can explain to a distant geometer what a given angle is, so that he can set one up for himself; I can never explain to him what a metre is without taking one to him, and this assumes that a meaning can be attached to saying that it is unaltered in the process of transport. Once a method has been described for assigning distances and ascertaining angles, a geometry can be adopted and co-ordinates can be assigned to any distant object. It is not necessary here to go into details. The significant step is that the measure or scale of spatial relationship can be constructed out of clock-observations. Space is constructed out of temporal experience —not, that is, its three-dimensional aspect but its scale-aspect. In the case of a one-dimensional world, a geometry is not necessary, and space measures can be constructed purely out of temporal experiences. The adoption of a geometry is necessary when we recognize the three-dimensionality of our possible observations, *i.e.* that we can determine direction in term of two independent measures.

We now want to correlate or compare the clocks of two different observers. When we repeat our measures of the distance X of an object we may find that X remains constant or that X changes. If X happens to remain constant, it is not difficult to show how, if the object also carries an observer with a clock, the two clocks may be synchronized. And if three observers, A, B, C, by such synchronized clocks agree that they are at constant distances apart, it can be shown that the time-numbering of their clocks is unique. This time-numbering they will call uniform time. Whether it coincides with what we ordinarily mean by uniform time is another

matter, but this unique time-numbering is as far as three such observers can get when they pay attention only to the reception-time of signals. The unique time-numbering they arrive at would coincide with what we ordinarily mean by uniform time when the *strength* of the signals returned are also constant in time, provided we can say what we mean by comparing the strengths of signals. This involves the construction of a piece of apparatus capable of measuring signal-strengths, whose properties remained constant in time. These properties would include length measures of its parts, measured with the same arbitrary clock (now uniquely graduated). Now if another observer, B′, were, in our ordinary language, receding from A, he could be made to appear at a constant distance from A by letting A's clock run slow. This is equivalent to letting the unit of length conventionally adopted by A increase, so that the size of a signal-strength-measuring receiver would appear to decrease and the weaker signals now received would be estimated as weaker simply due to the smaller instrument used. I have not carried out all the mathematical details of this process, but the general inference is clear. Just as it is generally recognized that no observable differences would be produced in the universe if we had a length-measure arbitrarily changing, so when we base length-measures primarily on time-measures uniform time cannot be defined. Uniform time is a convention based on the simplest description of a set of phenomena occurring in nature—as is obvious when we examine its astronomical definition in terms of the earth's rotation, or in terms of dynamical clocks assumed to remain invariable.

All we can do then is to correlate different ways of time-keeping. The next problem of interest is then to correlate the time-keeping of observers in motion. Suppose then that *I*, whom I call observer A, repeat my observations on an object B, and find that X its distance changes as T the assigned epoch changes. Let us assume for simplicity that its direction remains constant. This assumes that a meaning can be given to invariance of direction; this can be accomplished with the aid of a gyro-compass. I can now repeat my observations as often as I please, and as close together as I please, either by using a morse-code method of signalling or signalling with differently coloured lights. I must simply be able to recognize and identify return-signals. I can then graph X against T. I can in particular find the slope of this graph at any time T. If this slope happens to be constant, I shall say that the object B is in uniform motion with respect to myself, and call the slope the velocity V, all in terms of my arbitrary clock. The value of V is unaltered by multiplication of the clock-readings by an arbitrary factor.

Suppose B, also provided with a clock, performs similar observations on myself, A. He can send me signals and receive them back;

choosing the same number c, he can assign epochs T′ and distances X′ to the events which are the arrivals of the signals at myself. He can thus determine my velocity with respect to himself.

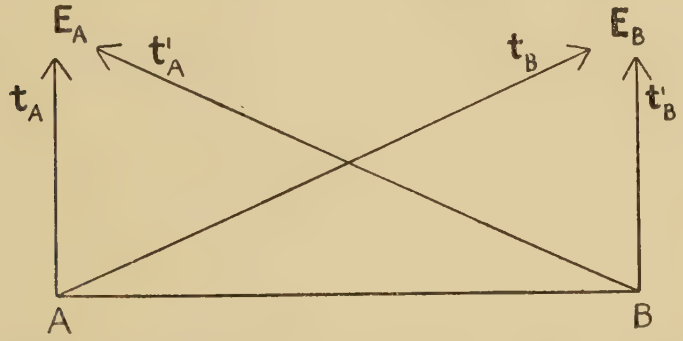
Now suppose that B stands in precisely the same relation to A as A stands in relation to B. Then when A finds B to be moving with a uniform velocity, by his clock, there must exist a set of clock-graduations for B such that B finds A to be moving with a uniform velocity, and moreover with the same uniform velocity. For otherwise they would not be equivalent. A and B are then said to possess similar clocks. The possession of similar clocks by the two observers is thus capable of experimental test.

We are thus able to say what we mean by A and B possessing similar clocks without its being required to bring these clocks side by side. The latter test would indeed violate the conditions of the situation, the essence of which is that the two clocks are in relative motion. If we reduced one clock to relative rest, we should have no means of testing whether we had altered the clock in the process. As it is, we have effected a comparison of the clocks whilst they are in motion: what A finds B is doing by his (A's) clock, is described in the same way by A as what B finds is happening to A (by B's clock), is described by B; A describes his experience of B in the same way as B describes his experience of A.

A and B can, however, make one further type of observation. They can read one another's clocks. Or, what is the same thing, B can inform A of the time recorded by his (B's) clock, at the epoch of arrival of a signal from A. A can then compare B's reading of B's clock with the reading of his own clock which he has assigned as simultaneous with this event. In ordinary words, A reads B's clock through a telescope, at a certain time by his own clock, corrects this latter time for the time of travel of the signal, and compares his own (corrected) clock-reading with his telescopic observation of B's clock. It is easy to show that the direct reading by A through a telescope is equivalent to the communication of information by B and that the signal-velocity is equal to the arbitrarily chosen number c.

It by no means follows that A and B agree on the epoch they assign to the event which consists of reading B's clock. This was Einstein's great discovery. A procedure for correlating the readings, equivalent in the sequel to Einstein's results, is as follows. Consider an event at B to which B assigns the epoch t'_B (by direct reading of his clock); and let A assign the epoch t_B to it by his clock, after making the necessary light-signals. Consider secondly an event E_A at A, to which A assigns the epoch t_A (by direct reading of A's clock); and let B assign the epoch t'_A to E_A by his clock, after making the necessary signals. Then since A and B are supposed to be completely

equivalent in all their relationships, if t'_B happens to equal t_A, t_B must equal t'_A. In other words, suppose that A makes a graph of his value for the epoch of E_B, namely t_B against B's value for the same event, namely t'_B; then the same graph must result if B plots t'_A, his value for the epoch of E_A, against t_A, A's value. These graphs could be actually drawn and compared. In mathematical language we should



Suffixes A and B denote locations of events. Unprimed symbols (t_A, t_B) are A's assignments of epoch. Primed symbols (t'_A, t'_B) are B's assignments of epoch.

have $t'_B = f(t_B)$ and $t_A = f(t'_A)$, where the two f's denote the same function.[1]

Now it can be shown mathematically that the only possible form of the graph for which this relation holds is represented by

$$t'_B = t_B(1 - V^2/c^2)^{\frac{1}{2}}$$

and

$$t_A = t'_A(1 - V^2/c^2)^{\frac{1}{2}}$$

provided the clocks were synchronized to read zero at the instant when A and B parted company. In words, B assigns to an event near himself an earlier epoch, by his clock, than A assigns to the same event by his clock. Similarly A assigns to an event at himself an earlier epoch than B assigns to the same event. To A, B's clock runs slow; to B, A's clock runs slow. The degree of running slow is the more pronounced the faster the relative motion.

This is a well-known result in the theory of relativity,[2] but our presentation of it has a different logical setting. We have not used the concept of a rigid measuring-rod; and we have not assumed that A and B are in "empty space." We have not taken the constancy of the velocity of light from observation. We have adopted it as an

[1] When A and B have chosen clock-graduations for which the two f's are identical, they may be said to be provided with *identical* clocks.

[2] What are usually called the "Lorentz formulae," connecting A's and B's assignments of epochs and co-ordinates to any event whatever, can be shown to follow from the above formulae without further assumptions.

axiom giving us our definitions of lengths. We have simply assumed that A and B possess temporal experiences and that they stand in completely equivalent relationships to one another. This condition is satisfied if A and B stand in the same relation to the rest of the universe. Our experimental basis is that it is actually possible to realize in experience two equivalent observers in uniform relative velocity.

Let us in fact apply this result to the whole universe. It is well known to everybody nowadays that the universe as a whole is expanding. By this we mean that the extra-galactic nebulae are receding from us and from one another, receding from one another, moreover, at rates which are proportional to their separations.

This is the same thing as saying that if we take any nebula and divide its velocity by its distance, we get the same result for all nebulae. We do not know from observation how this quotient changes in time. It appears to be the same all over the universe at the present epoch (*i.e.* for nebulae considered simultaneously in the above sense of simultaneity) as far as is yet observed. Whether at another epoch it will be the same we do not know. Some current theories assume that the coefficient of the proportionality is locally constant in time, and hence that the nebulae are being accelerated. Now, however a nebula is being accelerated, its velocity can never exceed the velocity of light.[1] Thus, if the nebulae were being accelerated outwards, each one would ultimately acquire the velocity of light, and the law of proportionality of distance and velocity would cease to be obeyed, for the velocities would tend to become the same for all nebulae, but the distances would be different for different nebulae. In that case the velocity-distance proportionality would be an altogether ephemeral thing. There is, however, no observational evidence that the nebulae are being accelerated. I have given reasons elsewhere for supposing that the velocity of each nebula is a constant, apart from effect of irregularities in distribution leading to residual gravitational fields. We may consider a smoothed-out model of the universe in which the velocity of each is actually constant, the distance increasing accordingly with the time. Observation and all theories agree in showing that the nebulae were all very close together about 2,000,000,000 years ago, *reckoned by clocks at ourselves*. The nebulae may then be likened to an army of objects which all parted company at a definite epoch in our own past, and since then have moved each with its own constant velocity.

[1] Statements sometimes made to the contrary, as for example that nebulae may ultimately possess velocities greater than that of light and so pass out of causal connection with the rest of the universe, are erroneous. The error came in owing to a false identification of "cosmic" time with the time of experience.

Now in all schemes so far proposed for the universe, every particle or nebula in the ideal scheme is equivalent to every other. The relation between itself and the rest of the universe is the same whatever nebula is chosen. The reason that this condition is imposed[1] on world-models is that we have only actually observed a very small portion of the universe and we want to build up a model of the whole which will not endow the observed portion with special properties. Removing the last vestige of an anthropocentric view of the universe, we refuse to consider our own viewpoint as special, and we regard any other viewpoint as equally good. If you like, we are extrapolating the observed portion of the universe in the fairest possible way, first by constructing round the edges of the observed portion adjacent portions as similar as possible, then building on to those, and so on, meaning always by "as similar as possible" the possession of the same features as viewed from the viewpoint to which the extrapolation is extended. Distance and epochs of events on the nebulae can then be assigned in principle by the methods given. The space in which they are embedded is a purely constructed entity.

It may seem at first sight that if we construct a world-model with the same relation of each particle to the rest, then it must extend indefinitely through infinite space. For the possession of an *experienced* boundary is impossible. Yet it can be shown that on the procedure we have outlined, in the view of any observer the system is of finite radius and the distance of the remotest members of the system cannot exceed a finite length. The apparent paradox is removed by noting that the nebulae form what is called an "open" set of points, infinite in number, having the surface of a sphere for the set of limiting points. The limiting points themselves are not occupied, but representative points occur within arbitrarily small distance of them. The important results for my present purpose are that the total number of members of the world-system is not finite, and the most distant are receding with all but the velocity of light, *i.e.* we can find members moving with speeds arbitrarily close to that of light.

Let us now put together the four considerations: (1) the relativity of time; (2) the running-down of any finite portion of the universe according to the second law of thermodynamics; (3) the expansion of the universe, with members moving at all speeds up to (but just not including) that of light; (4) the infinitude of particles in the universe.

Consideration (4), which is implied by the analysis of world-

[1] In most current presentations of relativistic cosmology this condition is not *imposed*, but is verified *a posteriori*. In my own presentation it is imposed *a priori*.

structure just discussed, seems to me to be necessary if we are to avoid the philosophical difficulties which would crop up if the number of particles in the universe were finite. For they could always be mapped in a flat constructed space, and if this space were finite the particles would possess a centre of position, and so absolute location in this space would have a meaning. We should want to ask, but be unable to answer the question, why the universe came to be associated with this particular standard of absolute position and absolute rest. We should in fact have found a frame of reference that was specific, yet we could not mention anything to distinguish this frame from any number of physically equivalent ones, except that the universe happened to select it for occupation. In crude language, how could the universe possibly know what frame it was adopting—how could it identify it in the desert of featurelessness. A universe possessing an infinite number of particles does not necessarily possess a mass-centre, and in the case of the model I am discussing definitely does not possess one. Each particle is equally a centre of symmetry. But if the universe were supposed mapped in a finite curved space, and consisted of a finite number of particles, it would still determine an absolute standard of rest in this completely featureless medium, and no one could say how it does it! In the model I am considering, relative position and velocity alone have a meaning.

Now let us compare our own experiences with the experiences of an observer situated on a very distant nebula moving with nearly the speed of light. The clock of the moving distant observer will be, to us, almost standing still, and the epoch at which it stands will be little removed from the epoch at which synchronization occurred, that is, the epoch of separation. Thus whilst our own clock records 2,000,000,000 years as the time that has elapsed since all the nebulae were close together, for a nebula moving at 9/10 of the velocity of light, the time *now* read by the moving clock (our *now*) will be $2{,}000{,}000{,}000 \times \sqrt{1 - 81/100} = 870{,}000{,}000$ years; for a nebula moving at 99/100 of the velocity of light, 280,000,000 years; for a nebula moving at 999/1,000 of the velocity of light, 90,000,000 years; for a nebula moving at 9,999/10,000 of the velocity of light, 28,000,000 years. These figures have a perfectly concrete meaning. If we detect an event taking place, as we say, *now* on a nebula moving with 9,999/10,000 of the velocity of light away from us, then the age of the universe reckoned by the moving observer on this nebula, at that event is only 28,000,000 years—comparable with the age formerly assigned by Kelvin to the universe in our own time-scale. We see that the phrase "the age of the universe" has no objective content. Given an event, we have to mention an observer in whose "now" it occurs, and the ages are different according to the observer chosen.

It then follows that the universe for the distant observer has only been running down for 28,000,000 years. For us it has been running down for 2,000,000,000 years. And these two estimates relate to the same event, observed by two different observers. Thus for the fast-moving observer the universe has run down less than for us, at the two "nows" corresponding to the same event. Since, with an infinite number of nebulae in the world running away from us with all speed up to that of light, we can always find an example of a nebula with a velocity which is arbitrarily close to that of light, we can therefore specify a nebula for which, at the event on it in our "present," the running-down of the universe is as little as we please (reckoned from its zero).

It follows that though the universe is running down for each separate observer, no absolute measure of the amount it has run down at any definite instant of our time can be given. For us, it has run down a definite amount. But for other observers whom we regard as contemporaneous observers, it has run down less, and we can always in principle mention observers for whom it has run down as little as we please. Here there is no sense in which it can be said that the universe is running down independent of an observer. In the ordinary sense of *always*, it always contains observers or states which are practically at the outset of their world-careers, ready "wound-up." The world-system, though decaying and dying at each separate place and for each separate observer, always comprises other observers, at great distances, for whom this process of decay has hardly gone on at all. It is not a question of cycles of rejuvenation, or of a process of revivification. The fresh start is always present, but it is not really a fresh start, it is the one start that every portion had, but differently reckoned. The world-system is like a tree which decays at its centre, but lives on just under the bark. Thus no absolute sense can be attached to saying that the world *has* run down, though everywhere it *is* running down. It always contains experiences for which the process of running down has hardly progressed at all. The world therefore lives for ever. Near its apparent boundary, the world in Keats' words is

> "For ever piping songs for ever new . . .
> For ever panting and for ever young."

If we call "creation" the indescribable and unobservable state out of which the systems were born (for us, 2,000,000,000 years ago) then we may say that there are always events in the world for which antecedent creation is only just a thing of the past. We cannot observe the event of creation itself, even in the limit, for it is only an occurrence *in our present* for nebulae moving with the speed of light, and these if they existed would be invisible, unobservable.

The event of creation itself is discreetly mantled in invisibility. Not only can we not go behind creation, we cannot go right up to it; but we can get within an arbitrarily short experience of it, by observations that are in principle capable of being carried out. There is no re-enactment of creation. Creation—one event; I have missed out the copula. You can say "was" or "is" at your choice. There is no difference in the two propositions, until an observer is mentioned. In any one observer's world-wide present, for whom creation "was" so many years ago, we can always specify events the observers at which reckon creation as arbitrarily close to "is."

This situation may be very difficult to imagine. The difficulty is just that of imagining an infinity of objects in a finite space. (It must be remembered that the dimensions in the direction of motion are reduced by the motion, in accordance with the law of the Lorentz contraction.) But there is no difficulty in *describing* what we may expect to observe, and this is all that can be demanded. The usual theories put the burden of the trouble on the difficulty of imagining a conceptual curved space. I transfer the difficulty to that of imagining an open set of points. This is not really difficult, and in any case it has the advantage of being describable in terms of experience.

The application of the second law of thermodynamics, invoked in the ordinary proof that the universe is running down, involves the axiom that in any process which occurs in the world it is possible to find another portion of the world unaffected by the process. For to estimate the increase of entropy consequent on the change—to estimate the degree of "running-down" involved in the process—it is necessary to compensate the process by reversible changes carried out between the affected part of the universe and the unaffected part. A process must be imagined in which the affected part is restored to its initial state, and the entropy-changes thereby occasioned in the originally unaffected part estimated. It follows that if a process goes on which affects the whole of the universe simultaneously it is impossible to estimate the change of entropy. In such case the proof of the entropy-increase breaks down. Now the expansion of the universe, with bodies separating at different speeds, is a phenomenon which goes on of itself and affects the relations of all the separate parts continuously; it may be described as a non-uniform radial dilatation, resulting in increasingly perfect velocity-segregation of the separate parts. But the universe is not an enclosed system. Unlike the systems considered in thermodynamics, it has no confining boundary, though as we have seen it has an apparent though unattained boundary. Whether it is surrounded by "empty space" or not is a meaningless question, since it can be shown that there is no possible causal connection

between the objects (if any) outside the sphere of observation and those inside it. The expanding universe may be described as creating space as it expands, or alternatively as expanding into empty space. This external unobservable space need not be actually empty; its contents can be readily described mathematically, but they automatically make room for the observable part to expand into, so that the space behaves in effect as empty. The external occupants are genuine wills-o'-the wisp. In either case the system is totally different from an enclosed system, and it acts as its own Maxwell's sorting demon. Maxwell pictured a demon capable of opening and closing a door in a partition in a gas-filled vessel in such a way as to segregate fast-moving molecules from slow ones. The natural expansion of a cloud of objects such as nebulae into "empty" space is precisely such a type of segregation. For it effects and then accentuates a complete sorting-out of velocities, more and more completely concentrating the faster objects at the greatest distances. Just as Maxwell's sorting demon could cause the gas on one side of a partition to become hot and the other cold without expending mechanical work, and so could avoid the consequences of the second law of thermodynamics, so the universe as a whole avoids the heat-death. It does this in virtue of the expansion and the infinity of particle number, taking into account the relativity of time.

To summarize, the passage of time is a definite part of the experience of each individual, and from it may be constructed both time-measures and space-measures without the introduction of the concept of the rigid body as a length-measuring tool. Different individuals assign different epochs and different distances to the same event, and the relation between the epochs they assign is perfectly definite for any two observers (in uniform relative motion) who stand in the same relation to the rest of the universe. This relation, predicted long ago by the special theory of relativity, is derived here from a different observational basis. It is applicable as it stands to the different bodies forming constituents of the expanding universe, which presumably contains, and on a reasonable basis for extrapolation certainly contains, particles moving with all speeds up to that of light, and, moreover, an infinite number with speeds lying within any arbitrarily small fraction of the velocity of light. Such particles, in the world-wide instant of an observer near ourselves, estimate the world far younger than we do. For them the world has scarcely begun to run down. Particles, nebulae, or observers can be specified arbitrarily near to the event of creation, in their own reckoning, at the world-wide instant corresponding to any specified event in the history of any other observer. The world is thus running down, ageing, and decaying for each separate

observer, but contains an infinite sequence of observers for whom it is arbitrarily young. The world is thus a continuing system; each particle or nebula has an evolutionary experience behind it and in front of it, with ultimate decay as its goal, yet the world as a whole cannot be said to decay. It is not the same in an observer's to-day as in the observer's yesterday, but it is the same for ever. Creation never recedes into the past; it is only just beyond the limit of observability in our own present. Time advances for each separate observer, but the universe as a whole knows no definite age at an assigned event; the world-wide instant of the observer to whom this event occurs contains experiences which assess the age of the world at all values from that assigned by the given observer down to zero. Each observer may legitimately count himself, and will in fact reckon himself, as the world's oldest inhabitant.

I believe that these various considerations go far towards removing the apparent contradictions between thermodynamics and relativity to which we earlier drew attention. Though I have been led to these conclusions by studying one particular possible model for the universe, the same conclusions, or substantially similar ones, probably follow on any model, in particular on those which make use of a conceptual curved, expanding map—so-called expanding space—to represent the world. The main points are the existence of nebulae moving with all speeds up to that of light, so that all possible smaller time-reckonings are existent in the world-instant of a given observer at a given time-reckoning; the inevitable running-down of the universe for each separate observer, with the existence of all lesser degrees of run-downness in the same world-wide instant; and the existence of a singular condition for nebulae at the maximum distance, such that the singularity in our past experience which we call creation reproduces itself at, and is all but observable near, the apparent boundary of the system. I commend to philosophers the idea that creation is ever present in the universe; not a new idea, but one to which, in my opinion, we are led by the strictest interpretation of modern physics and astronomy in the light of their philosophies.

SIR ARTHUR EDDINGTON AND THE PHYSICAL WORLD

W. T. STACE, Litt.D.

Sir Arthur Eddington's brilliantly phrased article, "Physics and Philosophy," which appeared in the January 1933 issue of *Philosophy*, seems to me to contain a number of things which are calculated to be provocative to the mere philosopher. And I propose in this article to discuss what appears to be one of the most important of these provocative things, namely, Sir Arthur's view of the status of the physical world.

I hope I shall not be misrepresenting his general position—so far as it is philosophical, and not specifically scientific—if I boil it down to the following rough paraphrase. "There are two quite distinct worlds: the *familiar world* of sticks and stones and stars, of colours and sounds and smells; and the *physical world*, which consists of electrons, protons, etc. The physical world has no colour or smell or taste. It has not even spatial extension. Time may possibly be a feature of it. It is doubtful whether it possesses number and multiplicity—twoness, threeness, and so on—in the sense in which number and multiplicity apply to the familiar world of sticks and stones. The familiar world consists of—or perhaps I might say, is characterized by, though it makes no essential difference—sense-data which are 'in minds' and are even 'illusions and subjective interpretations.' The relation between the two worlds is extremely remote and indirect, and the physical world is reached by *inference* from the familiar world. We never come into direct contact with it. We never see it, touch it, smell it, taste it. Presumably we could not do so even if our senses were infinitely acute, for it *has* no colour, taste, etc. We only infer it from the sense-data which are 'in the mind.' This physical world of electrons and protons, however, is not a hypothetical entity or fiction. It is real"—though Sir Arthur avoids the use of the word real. "It actually exists."

This general scheme of things has been familiar since the seventeenth century. The details—the electrons and protons—are, of course, new. And the exclusion of space and number from the physical world was not made by the seventeenth-century founders of the scheme, though that too has its analogues in the past. But the "bifurcation of nature"—as Whitehead has called it—into two totally unlike worlds, the denial that colour and the other sensory qualities belong to the physical world, and the suggestion that they

are merely "mental," that they are "in minds," that they are even "illusions" and "subjective interpretations," go back, of course, to Galileo, Hobbes, Locke, Newton.

That there are grave objections to calling colours and other sensory qualities "mental," to supposing that they are in no sense objective, need not, I think, detain us. For these objections, and the arguments on which they are based, do not, I believe, concern the physicist, though they do concern the philosopher. For example, someone might argue as follows. He might say: "The view that sensory qualities are mental depends upon the uncriticized dogma that there are only two realms to which they could belong, the physical and the mental. If this were so, then to prove that they are not physical would be the same as proving that they are mental. And this is what the physicist does. But the assumption on which this argument is based, the traditional common-sense division of the universe into mind and matter and nothing else, is false. There is a third realm, which is neither physical nor mental, but which we may call the 'neutral' realm. Sensory qualities belong to this realm, and are neither physical nor mental." So far as I can see, the physicist would not have the slightest objection to such a view. He would say, I think, "This is no concern of mine. My business is to describe the physical world, not the mental world. I feel sure that sensory qualities are not part of the physical world. Indeed I can prove it. I have expressed this by saying that they are subjective. If that word is considered objectionable, I have not the least objection to using some other word such as 'neutral.' It appears to me that this is hair-splitting—but hair-splitting perhaps is the special business of philosophers. At any rate it is to me a matter of no importance. All I insist on is that colours, sounds, and their like, do not belong in the bag of things which I call the physical world. So long as you admit this, you can put them in whatever other bag you like."

From this point of view Sir Arthur's statement, "Mind is the first and most direct thing in our experience; all else is remote inference"—which, he says, horrified the philosophers so much—would appear to have nothing horrifying in it except the apparent identification of sense-data with minds. *That*, I suppose, was what shocked the philosophers. And that is not, I fancy, a matter on which Sir Arthur would wish to press his opinion. What he intended to say evidently was, "Sense-data are the first and the most direct things in our experience; all else is remote inference." Whether sense-data are mental or neutral, whether they are "in" minds or "outside" them, he will not care, so long as they are not supposed to be characters of his electrons and protons. And to this statement —that they are not characters of electrons and protons—I do not

think that the philosopher can possibly object without going impertinently outside his province. If the physicist tells us that atoms have no colour, taste, or smell, we must, I have no doubt, accept his word for it. At any rate I propose for the purposes of this article to do so.

Thus, if we cut out all the questionable statements about sensory qualities being "in minds," being "subjective illusions," and so forth, that part of Sir Arthur's philosophy on which, I think, he would desire to insist might be simply stated thus: "There exists a physical world of protons and electrons which do not possess the sensory qualities. And this world is not in any way hypothetical or fictitious. It is real."

I apologize for foisting upon Sir Arthur the word "real" to which he objects—or of which, at least, he is timorous—but it is convenient, and I do not think I mean by it anything more than he means to express by other language. I am not using it as "a sort of halo," or endeavouring to lay any kind of verbal trap. I mean by it nothing more than is meant when we say that the cat is real, the moon is real, the table is real. I mean by it simply "existent."

Now I do not believe that protons and electrons are real. I believe they are just what Sir Arthur says they are not, namely, fictitious or hypothetical entities, or, as I prefer to call them, mental constructions. And this is the issue which I wish to discuss.

First of all, however, let me say that such a view, if accepted, casts no sort of aspersion upon the validity of science, nor in any way derogates from its dignity or its claim to teach us "truth"—provided the word "truth" is properly interpreted. Science can get on just as well with fictitious atoms as it can with real ones. In fact I cannot see any reason why the physicist, as such, should take the slightest interest in the question whether his atoms are real or not. And I suspect that, if he is inclined to regard it as an insult to his atoms to say that they are not real, or if he incontinently rejects that view without consideration, this is merely because he—like some others of us—cannot avoid the absurd superstition of supposing that words like "real" and "existent" convey a sort of halo. I suspect that this is at the bottom of Sir Arthur's insistence that atoms are not "mere" hypothetical or fictitious entities. Why should the physicist be concerned with the ontological status of the atom? It is, I think, purely a metaphysical question, and not a scientific one at all.

To show that this view is not really obnoxious to scientists themselves, I will venture two quotations. "It matters little," says Poincaré, "whether the ether really exists; that is the affair of metaphysicians. The essential thing for us is that everything happens as if it existed, and that this hypothesis is convenient for the explana-

tion of phenomena."[1] We may very well substitute atoms for ether here. It is true, I believe, that atoms are supposed to be more strongly evidenced than ether. But that does not affect the principle which Poincaré is asserting. "Whether the man of science," says Mr. E. N. de C. Andrade, "regards his atoms as having an ultimate reality or not does not affect the validity of the theory; the theory is just as useful in introducing order and promoting discovery if they are merely polite fictions as if they are desperate realities."[2] Thus the question at issue is not, I believe, of any importance to the physicist. But it is of importance to the philosopher, that is, to the person perversely interested in such puzzles. And I believe that, indirectly, it is of importance to the plain man, as I shall briefly show at the end of this article.

Sir Arthur tells us—perfectly correctly, I think—that we can never be directly conscious of anything except sense-data. (I am not discussing whether we can be conscious of consciousness, or of our "souls." I am discussing only external things.) This rules out any suggestion that we can know that atoms exist by *perceiving* them. We never do perceive them. We perceive only sense-data. It is true that Sir Arthur says, "I am not sure whether I ought to say that I have seen an electron. . . . I have seen a wavy trail. . . . I give the name electron to the object which has caused this trail to appear." He says also with truth that the same doubt exists as to whether anyone has ever seen a star. We see a "disk of light" and we give the name star to the "object which some hundred years ago started the chain of causation which has resulted in this curious light-pattern." There is no inconsistency here, and the matter is merely one of terminology. I shall adopt the usage of saying that what we see is neither a star nor an electron, but a "disk of light" in one case and a "wavy trail" in the other. These are both sense-data. And this agrees with the view that we only perceive sense-data. We are agreed, then, that we cannot say that atoms exist because they are *perceived* to do so.

Hence, thinks Sir Arthur, the atom and the star must both be "inferences" from sense-data.

How such an inference can possibly be made (in either case) I do not know. I am not absolutely certain that Sir Arthur means that we infer these objects by means of the law of causation. In so supposing I *may* be misunderstanding him. But I think that is what he means. He uses language which certainly seems to imply it. The clues by means of which we pass from sense-data to the physical world are, he says, "certain regularities in our sense-data," which "provide us with the laws of physics," and also "provide the rules

[1] *Science and Hypothesis*, Halsted's translation, p. 174.
[2] *The Mechanism of Nature*, p. 6.

of inference." It may perhaps be true that not all the regularities in the sense-world are causal sequences. But I think it is to causal sequences that Sir Arthur refers. He speaks of the star (physical object) as "the object which . . . started the chain of *causation* which resulted in this curious light-pattern" (the sense-datum), and of the electron as the "object which has *caused* the wavy trail." Thus he certainly does regard the physical world in general as the *cause* of which the familiar world is the *effect*. And I think it is clear that the kind of inference by which he passes from sense-data to electrons and protons is the inference from effect to cause. The inference would then be: All things must have causes. The disk of light and the wavy trail must have causes. And we can infer the causes, *i.e.* the star and the electron, from the effects, namely, the sense-data.

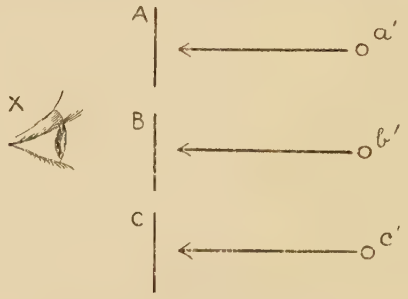
In the latter part of his article Sir Arthur seems to throw doubt upon the existence of the law of causation. He calls it "a principle which science has found no trace of." If this is so, it does not seem at once clear how he can use this principle to infer the causes of sense-data. But perhaps this apparent inconsistency is due to the necessarily brief and popular character of his article. It is clear, however, that the law which connects cause with effect, electron with wavy trail, will have to be reinterpreted as an "indeterministic" law. Possibly this can be done, and I will not press the point further. I will assume it agreed that there is *some* kind of law of causation —whether deterministic or indeterministic—by means of which an inference is supposed to be made from effect to cause, from sense-data to atoms.

But is it not clear that such a use of the law of causation, however interpreted, is invalid? The only reason we have for believing in the law of causation is that we *observe* certain regularities or sequences. We observe that, in certain conditions, A is always followed by B. We call A the cause, B the effect. And the sequence AB becomes a causal law. (I am ignoring here the great difficulties in defining causality, and the fact that some writers, such as Mr. Russell, would extrude it altogether from science and substitute for it "functional dependence" or some other such conception. And I am intentionally using the crude and popular symbolism for a sequence of phenomena AB for the sake of simplicity.)

Now these sequences or regularities are always among sense-data. This must be so, because, on Sir Arthur's own showing, we never observe anything except sense-data, from which it follows that all *observed* sequences are sequences of sense-data. A is a sense-datum, and B is a sense-datum, and any other cause or effect ever observed by any human being must have been a sense-datum. This means that, so far as anyone has ever observed, the cause of one sense-

datum is always another sense-datum, and that all known causal laws apply solely to the world of sense-data, and not to anything beyond or behind it. And this in turn means that we have not got, and never could have, one jot of evidence for believing that the law of causation can be applied *outside* the realm of sense-data, or that sense-data can have any causes (such as the supposed physical objects) which are not themselves sense-data. This argument, it will be observed, holds equally whether we call sense-data mental entities, neutral entities, illusions, or anything else.

Put the same thing in another way. Suppose there is an observed sequence A-B-C represented by the vertical lines in the diagram.



Then the cause of C is B, and the cause of B is A. A, B, and C are all sense-data. The observer X sees, and can see, nothing except A, B, and C, and, of course, other sense-data in the general world of sense-data. What *right* has he, and what *reason* has he, to assert causes of A, B, and C, such as *a'*, *b'*, *c'*, which he can never observe, behind the sense-data? He has no *right*, because the law of causation on which he is relying has never been observed to operate outside the series of sense-data, and he can have, therefore, no evidence that it does so. And he has no *reason* because the phenomenon C is *sufficiently* accounted for by the cause B, B by A, and so on. It is unnecessary and superfluous to introduce a *second* cause *b'* for B, *c'* for C, and so forth. To give two causes for each phenomenon, one in one world and one in another, is unnecessary, and perhaps even self-contradictory.

Is it denied, then, it will be asked, that the star causes light-waves, that the waves cause retinal changes, that these cause changes in the optic nerve, which in turn causes movements in the brain cells, and so on? No, it is not denied. But the observed causes and effects are all sense-data, or at least possible sense-data. And no sequences of sense-data can possibly justify going outside the series of sense-data altogether. If you admit that we never observe anything except sense-data and their relations, regularities, and sequences, then it is obvious that we are completely shut in by sense-data,

and can never get outside them. Not only causal relations, but all other observed relations, upon which *any* kind of inferences might be founded, will lead only to further sense-data and their relations. No inference, therefore, can pass from what is sense-datum to what is not sense-datum.

The fact is that atoms are *not* inferences from sense-data. No one denies, of course, that a vast amount of perfectly valid inferential reasoning takes place in the physical theory of the atom. But it will not be found to be in any strict logical sense inference *from sense-data to atoms*. An *hypothesis* is set up, and the inferential processes are concerned with the application of the hypothesis, *i.e.* with the prediction by its aid of further sense-data, and with its own internal consistency.

That atoms are not inferences from sense-data means, of course, that from the existence of sense-data we cannot validly infer the existence of atoms. And this means that we cannot have any reason at all to believe that they exist. And that is why I propose to argue that they do not exist—or at any rate that no one could know it if they did, and that we have absolutely no evidence of their existence.

What status have they, then? Is it meant that they are false and worthless, merely untrue? Certainly not. No one supposes that the entries in the nautical almanac "exist" anywhere except on the pages of that book and in the brains of its compilers and readers. Yet they are "true," inasmuch as they enable us to predict certain sense-data, namely, the positions and times of certain "disks of light" which we call the stars. And so the formulae of the atomic theory are true in the same sense, and perform a similar function.

I suggest that they are nothing but shorthand formulae, ingeniously worked out by the human mind, to enable it to predict its experience, *i.e.* to predict what sense-data will be given to it. By "predict" here I do not mean to refer solely to the future. To calculate that there was an eclipse of the sun visible in Asia Minor in the year 585 B.C. is, in the sense in which I am using the term, to predict.

In order to see more clearly what is meant, let us apply the same idea to another case, that of gravitation. Newton formulated a law of gravitation in terms of "forces." It was supposed that this law —which was nothing but a mathematical formula—governed the operation of these existent forces. Nowadays it is no longer believed that these forces exist at all. And yet the law can be applied just as well without them to the prediction of astronomical phenomena. It is a matter of no importance to the scientific man whether the forces exist or not. That may be said to be a purely metaphysical question. And I think the metaphysician will pronounce them fictions. But that would not make the law useless or untrue. If it

could still be used to predict phenomena, it would be just as true as it was.

It is true that fault is now found with Newton's law, and that another law, that of Einstein, has been substituted for it. And it is sometimes supposed that the reason for this is that forces are no longer believed in. But this is not the case. Whether forces exist or not simply does not matter. What matters is the discovery that Newton's law does *not* enable us accurately to predict certain astronomical facts such as the exact position of the sense-datum, the "disk of light," known as the planet Mercury. Therefore another formula, that of Einstein, has been substituted for it which permits correct predictions. This new law, as it happens, is a formula in terms of geometry. It is pure mathematics and nothing else. It does not contain anything about forces. In its pure form it does not even contain, so I am informed, anything about humps and hills in space-time. And it does not matter whether any such humps and hills exist. It is truer than Newton's law, not because it substitutes humps and hills for forces, but solely because it is a more accurate formula of prediction.

Not only may it be said that forces do not exist. It may with equal truth be said that "gravitation" does not exist. Gravitation is not a "thing," but a mathematical formula, which exists only in the heads of mathematicians. And as a mathematical formula cannot cause a body to fall, so gravitation cannot cause a body to fall. Ordinary language misleads us here. We speak of the law "of" gravitation, and suppose that this law "applies to" the heavenly bodies. We are thereby misled into supposing that there are *two* things, namely, the gravitation and the heavenly bodies, and that one of these things, the gravitation, causes changes in the other. In reality nothing exists except the moving bodies, or moving sense-data. And neither Newton's law nor Einstein's law is, strictly speaking, a law of gravitation. They are both laws of moving sense-data, that is to say, formulae which tell us how the sense-data will move.

Now, just as in the past "forces" were foisted into Newton's law (by himself, be it said), so now the popularizers of relativity have foisted "humps and hills in space-time" into Einstein's law. We hear that the reason why the planets move in curved courses is that they cannot go through these humps and hills, but have to go round them! The planets just get "shoved about," not by forces, but by the humps and hills! But these humps and hills are pure metaphors. And anyone who takes them for "existences" gets asked awkward questions as to what "curved space" is curved "in."

It is not irrelevant to our topic to consider *why* human beings invent these metaphysical monsters of forces and bumps in space-

time. The reason is that they have never emancipated themselves from the absurd idea that science "explains" things. They were not content to have laws which merely told them *that* the planets will, as a matter of fact, move in such and such ways. They wanted to know "why" the planets move in those ways. So Newton replied, "Forces." "Oh," said humanity, "that explains it. We understand forces. We feel them every time someone pushes or pulls us." Thus the movements were supposed to be "explained" by entities familiar because analogous to the muscular sensations which human beings feel.

The humps and hills have been introduced for exactly the same reason. They seem so familiar. If there is a bump in the billiard table, the rolling billiard ball is diverted from a straight to a curved course. Just the same with the planets. "Oh, I see!" says humanity, "that's quite simple. That *explains* everything."

But scientific laws, properly formulated, never "explain" anything. They simply state, in an abbreviated and generalized form, *what happens*. No scientist, and in my opinion no philosopher, knows *why* anything happens, or can "explain" anything. Scientific laws do nothing except state the brute fact that "when A happens, B always happens too." And laws of this kind obviously enable us to predict. If science has now substituted humps and hills for forces, then it has just substituted one superstition for another. But for my part I do not believe that *science* has done this, though some *scientists* may have. For scientists, after all, are human beings with the same craving for "explanations" as other people.

I think that atoms are in exactly the same position as forces and the humps and hills of space-time. In reality the mathematical formulae which are the scientific ways of stating the atomic theory are simply formulae for calculating what sense-data will appear in given conditions. They enable the physicist to foresee, for example, that in certain conditions a "wavy trail" will appear. But just as the weakness of the human mind demanded that there should correspond to the formula of gravitation a real "thing" which could be called "gravitation itself" or "force," so the same weakness demands that there should be a real thing corresponding to the atomic formulae, and this real thing is called the atom. In both cases the motive is a desire for "explanation." And since causation is commonly (though wrongly) supposed to be a principle which explains things, the forces and the atoms are set up as "causes." A cause, however, must "exist," otherwise how could it have any existent effects? So the forces and the atoms must "exist." In reality the atoms no more cause sense-data to appear than gravitation causes apples to fall. The only causes of sense-data are other sense-data. And the relation of atoms to sense-data is not the relation of

cause to effect, but the relation of a mathematical formula to the facts and happenings which it enables the mathematician to calculate.

Sir Arthur says that the physical world has no colour, no sound, no taste, no smell. It has no spatiality. Probably it has not even number. We must not suppose that it is in any way like our world, or that we can understand it by attributing to it the characters of our world. Why not carry this progress to its logical conclusion? Why not give up the idea that it has even the character of "existence" which our familiar world has? We have given up smell, colour, taste. We have given up even space and shape. We have given up number. Surely, after all that, mere existence is but a little thing to give up. No? Then is it that the idea of existence conveys "a sort of halo"? I suspect so. The "existence" of atoms is but the expiring ghost of the pellet and billiard-ball atoms of our forefathers. They, of course, had size, shape, weight, hardness. These have gone. But our scientists still cling to their existence, just as their fathers clung to the existence of forces, and for the same reason. Their reason is not in the slightest that science has any use for the existent atom. But the *imagination* has. It seems somehow to explain things, to make them homely and familiar.

It will not be out of place to give one more example to show how common fictitious existences are in science, and how little it matters whether they really exist or not. This example has no strange and annoying talk of "bent spaces" about it. One of the foundations of physics is, or used to be, the law of the conservation of energy. I do not know how far, if at all, this has been affected by the theory that matter sometimes turns into energy. But that does not affect the lesson it has for us. The law states, or used to state, that the amount of energy in the universe is always constant, that energy is never either created or destroyed. This was highly convenient, but it seemed to have obvious exceptions. If you throw a stone up into the air, you are told that it exerts in its fall the same amount of energy which it took to throw it up. But suppose it does not fall. Suppose it lodges on the roof of your house and stays there. What has happened to the energy which you can nowhere perceive as being exerted? It seems to have disappeared out of the universe. No, says the scientist, it still exists as *potential* energy. Now what does this blessed word "potential"—which is thus brought in to save the situation—mean as applied to energy? It means, of course, that the energy does not exist in any of its regular "forms," heat, light, electricity, etc. But this is merely negative. What positive meaning has the term? Strictly speaking, none whatever. Either the energy exists or it does not exist. There is no realm of the "potential" half-way between existence and non-existence. And the existence of energy can only consist in its being exerted. If the energy is not

being exerted, then it is not energy and does not exist. Energy can no more exist without energizing than heat can exist without being hot. The "potential" existence of the energy is, then, a fiction. The actual empirically verifiable facts are that if a certain quantity of energy *e* exists in the universe and then disappears out of the universe (as happens when the stone lodges on the roof), the same amount of energy *e* will always reappear, begin to exist again, in certain known conditions. That is the fact which the law of the conservation of energy actually expresses. And the fiction of potential energy is introduced simply because it is convenient and makes the equations easier to work. They could be worked quite well without it, but would be slightly more complicated. In either case the function of the law is the same. Its object is to apprise us that if in certain conditions we have certain sense-data (throwing up the stone), then in certain other conditions we shall get certain other sense-data (heat, light, stone hitting skull, or other such). But there will always be a temptation to hypostatize the potential energy as an "existence," and to believe that it is a "cause" which "explains" the phenomena.

If the views which I have been expressing are followed out, they will lead to the conclusion that, strictly speaking, *nothing exists except sense-data* (and the minds which perceive them). I fully accept Sir Arthur's assertion that the star is in exactly the same position as the atom. "An electron," he says, "is no more (and no less) hypothetical than a star." This is undoubtedly true, if by a star we mean something other than the "disk of light" or other sense-data which we perceive. And if the atom is a fiction, so is the star, and for exactly the same reasons. What really exists is the "disk of light" in the one case and the "wavy trail" in the other. The rest is mental construction. But this does not mean that the conception of the star or the conception of the electron are worthless or untrue. Their truth and value consist in their capacity for helping us to organize our experience and predict our sense-data.

Sir Arthur cautiously holds back from using the expression that the physical world of atoms is "real," or that it is more real than the familiar world of sense-data. But he calls the latter a world of "illusions" and "subjective interpretations," which surely amounts to the same thing. And I do not think that there can be any question but that science has been guilty of encouraging the plain man to think that the world of sticks and stones, of sounds and colours, is somehow unreal, and that the real world consists of a whirl of atoms. In so doing science has gone outside its sphere, and has done a disservice by appearing to rob the world of its values and to insist that most of what is beautiful and admirable is mere illusion. But if the line of thought which I have endeavoured to outline in

this article is correct, then any such deduction from the discoveries of science is false. Chairs and tables and stars do really exist. They are exactly what they appear to be, coloured, spatial, resounding objects. Moreover, this familiar world is the only real world, the only world which really exists.

CARTESIAN MECHANISM

S. V. KEELING, M.A., D.-ès-L.

I

1. THOSE having a detailed and first-hand knowledge of Descartes's work seem agreed that it was highly original, genuinely critical and of permanent importance in the history of thought. And though they would differ in opinion on what are the reasons best advanced in support of their estimate, a majority would seem to regard the "Cartesian revolution" as summing up what is most meritorious in Descartes's philosophy and most lasting in his influence. They would find Professor E. Gilson speaking their mind when he declares, "Sur ce qu'il y a de nouveau et de strictement original dans sa pensée, aucun doute ne saurait subsister. Descartes est la revendication personnifiée du mathématisme universel. Là est sa grandeur." On the "novelty" and "originality" of this part of his work there can be no question. But when it is pointed out that novelty and originality can quite as well be claimed for what is unfounded as for what is founded, for what is false as for what is true, Descartes's admirers are inclined to feel that something more than what is novel and original should enter into the evidence they offer for their estimate. Now it is significant that M. Gilson does not assert more for the "mathématisme universel," and that Professor J. Chevalier denies that Descartes's importance does centre in this part of his philosophy. And though neither, so far as I know, has brought criticism to bear exclusively on this particular matter, the caution of the one and the denial of the other appear fully justifiable. The position is curious. That the constitution and behaviour of all natural bodies, animate and inanimate, are explicable completely by the principles of geometry and mechanics is of the essence of Descartes's Natural Philosophy. Yet this principle of mechanism which is extended so felicitously from one to another region of Nature, itself contains the seed of its destruction.

2. The 'revolution' Descartes initiated, the most radical and influential one between Aristotle and Kant, stands for the replacement of faith without demonstration for faith in demonstration. It exacts that whatever be accounted knowledge should provide complète rational satisfaction, from which it follows that whatever is truly knowledge is certain and is demonstrably so. "Probable knowledge", then, expresses a contradiction in terms, for probability is a characteristic of hypothesis and not of knowledge. And this

demand for rational satisfaction, when restricted to the explanation of all that is existent nature, is simply the principle of mechanism; a fulfilment of that demand under the same restriction would consist in a mathematical physics that is certain.

In forming a conception of what this demand implies respecting the character of all natural knowledge, it is desirable to observe at the beginning how that which Descartes calls "physics" is distinguished from what he calls "Philosophy of Nature", and how both stand to his "First Philosophy" or metaphysics. "My whole physics", he wrote to Mersenne, "is nothing but geometry." Physics is "another kind of geometry", one he describes as "concrete" in contrast with "abstract" (or Euclidean) geometry. He does not regard his "physics" as furnishing knowledge of existent nature; this is provided only by "Natural Philosophy". And "physics" is not differentiated from geometry by its method, but solely by the fact that geometry treats of only certain natures (the properties of Euclidean space), while "physics" treats of other (kinematical) properties. Thus, he adduces his researches into the constitution of salt, fire, snow, light, the rainbow, and the various theorems in the *Dioptric* and the *World* as fair samples of physical results. "Physics" denotes for Descartes, then, a totality of such results so co-ordinated and arranged as to exhibit the deducibility of any one from certain others. Applications of his new method enable him to elaborate successively an analytical geometry, a celestial physics, a terrestrial physics, a mechanistic physiology and a psycho-physics. Each of the branches resulting from those applications is to be regarded, however, as no more than a systematically developed and internally coherent description or a *hypothetical* explanation of a certain field of concrete objects. Each branch is a distinct and independent ensemble. And so long as the demand for ultimacy in analysis and certitude in knowledge is held in abeyance, each ensemble is to be accepted on its own merits and without reference to any metaphysic. Thus we find through his physical writings that, by assuming the principles of mathematics, suitable units of measurement, laws of impact and the possibility of an unlimited redistribution from time to time of matter in motion, Descartes is able to propose useful working hypotheses of the rotations of celestial bodies, the refraction of light, the functions of vision and the nervous system, the circulation of the blood, the causation of emotions and of the transactions between selves and their bodies generally.

3. But he maintains that it is the business of science to accomplish more than this, and believes that he himself has done so. He is not content to offer a "universal physics", but insists on furnishing a Natural Philosophy. It is not an ordered ensemble of working hypotheses or hypothetical explanations that he must provide, but

nothing less than a unified body of certain and ultimate knowledge, sufficient and necessary for explaining the character of objects and occurrences existent in various regions of Nature. In other words, what the principle of rational satisfaction exacts from science is knowledge and not merely comprehensive and serviceable formulae, unaccompanied by an 'interpretation' establishing the "cash value" of their terms. If it is regions of Nature as really constituted that the knowledge is to be 'of' (and not merely certain conceptual substitutes found convenient in scientific practice), then Descartes's insistence on the need of justifying our "knowledge of nature" (if it be justifiable) is in principle correct and enormously important. And the corollary that unless it be shown to be justified then what we called knowledge is no knowledge at all, but at best self-consistent hypothesis, is as pertinent to the natural science of to-day as to that of the seventeenth century. Although there can be no doubt that the particular metaphysic which Descartes thought would 'guarantee' his natural science, fails completely to do so, his realization of the need of *some* supporting metaphysic is indubitably right, if it is agreed that the business of science is to attain knowledge. It does not follow, however, that the relation of the 'supporting' metaphysic to the 'supported' science would be of the simple character that he supposed.

4. Descartes plainly does not intend his metaphysic to be a mere appendage to his physics. Without metaphysical 'justification', his physics, we saw, is but a connected group of working hypotheses—a set of 'possibly true' explanations, and his method is no more than a set of injunctions lacking authority—mere personal memoranda about his own preferred way of working. So this is the situation. The physics itself cannot justify its own essential mechanistic principle, nor can it warrant the assumptions of the method that underlie that principle, namely, (i) that there exists *in rerum natura*[1] entities formally similar to those Descartes called "simple natures"; (ii) that if such do exist, that they are identical with those which

[1] "Simple natures" are not ideas but essential 'ontal' elements, constitutive and explanatory, presupposed throughout the whole of Descartes's Metaphysics and Natural Philosophy. The theory of representative perception is, indeed, indirect evidence of this, for, eliminate simple natures, and there is nothing left to be represented in distinct idea, or misrepresented in confused ones. Commentators appear to think it sufficient to discuss simple natures when treating of his Method, and omit all reference to them thereafter. This seems to me regrettable, even though they but follow Descartes's example. They are mentioned in no other work than the *Regulae*. Yet the doctrine of innate ideas and the epistemology of the *Meditations* presuppose the existence of simple natures. Descartes's failure to carry them explicitly right through his metaphysic and to work out his theory of them in sufficient fulness seems to be mainly due to his later interest being dominated by difficulties of an epistemological rather than an ontological character.

Descartes indicated in his own list, and (iii) that his list is exhaustive. Nor, on the other hand, can the method (iv) justify its own prescriptions, or (v) itself establish that our actual cognitive operations are of the character described in the *Regulae* and the *Discourse*. Descartes, of course, considers he has provided justification in the metaphysics for these five assumptions of his physics and method. But the part of his metaphysics from which their justification is supposed to follow, there can be no doubt, calls to be rejected. And from this, it follows, that the most favourable verdict that can be returned for his Natural Philosophy is that of 'not proven'. But there is good reason to maintain (and this seems to be less often perceived) that even were his metaphysics acceptable, the Natural Philosophy would still have to be rejected. The remainder of this article will be devoted to establishing this assertion.

It is now evident that Descartes's distinction between physics and natural philosophy does not consist in a difference in the material import of their constituent propositions, but solely in the assertion that the propositions of "Natural Philosophy" are all metaphysically certified while this is true of no proposition in "physics". When the principles of physics (the laws of motion, and thence, all less general laws) are shown to follow with necessity from certain conclusions of the metaphysic (Natural Philosophy thus exhibited as a prolongation of metaphysics), the certainty of the latter confers on the physics previously and independently elaborated an *existential* import which in itself it does not contain and cannot provide. Thus Descartes's Natural Philosophy is a *part* of his metaphysics—*i.e.*, a part of that ontological account of the universe, in a sense in which the physics is no such part.

5. Now in order for our explanations to be rationally satisfying and to rank as constituent parts of Natural Philosophy and not merely as parts of physics, one condition to be complied with must be that the concepts we select as 'primitive' (*viz.*, those in terms of which scientific data are to be described and scientific results are to be formulated) must all be wholly intelligible and ultimate ones. In the development of our natural knowledge, then, we must never have recourse to a term whose character is not clearly comprehended and which cannot be demonstrated (by metaphysics) to be literally ingredient in the actual constitution of existent Nature. One immediate consequence, then, of Descartes's application of his universal method to that part of the existent which is Nature will be the elimination of all 'occult' qualities, faculties and "substantial forms", and their replacement by certain "simple natures". For no body of natural knowledge that is certain can afford to include or depend upon such unquestionably confused concepts as those of the "heaviness" of bodies, the "forms of fire", a "faculty of burning", a

"vegetative soul"—all essential to scholastic physics; nor even those more familiar sensible qualities which uncritical perception inclines us to regard as trustworthy. These are, one and all, 'irrationals'; the concepts such phrases express are so confused that no clear and certain knowledge can be developed out of them. And the "simple natures" which are to replace these confused notions are simple in two senses, *viz.* (i) none is complex (therefore the unique character of each can be completely comprehended by a single intuitive act, and is not known discursively, *i.e.*, analytically and progressively, through knowledge of their parts or factors, for they have none); (ii) none is derivative (therefore the unique character of each cannot be defined in terms of others, and the number of such natures can never be reduced).

II

6. Descartes does not seem to have given an exhaustive list of the natures which he considers promise intelligibility for the conclusions in which they appear as terms, and for the conclusions deducible from premises in which they so appear. He regards it sufficient to give (*Regulae*, vi, xii) as examples of the ultimate essences materially constitutive of existent Nature those named by the words "independence", "universality", "equality", "causality", "straightness", "extension", "figure", "motion", "substantiality", "existence", "duration" and "unity". Intuition of 'what it is' to be one and another of these is a prior and indispensable condition for the attainment of any natural knowledge. For natural philosophy is to be knowledge of actual Nature—not of a possibly (but not actually) existent Nature—and Cartesian metaphysics is to establish with certainty that actual Nature is made up of complex unities composed of just these ultimate and simple essences. Such then are the physicist's 'alphabet'; by recourse to one and another of them he is to spell out the significance of all the variety existent in Nature. The assumption which it is one of the objects of Descartes's metaphysics to justify is that natural unities would not possess the character they do unless there really existed *in natura* simple natures of precisely these kinds.

The exclusion of determinable qualities of sense (colours, sounds, temperatures, pressures, etc.) from his list of simple natures appears at first sight a somewhat arbitrary decision on Descartes's part. For such sense-natures also are "simple" in the same two respects as the simple natures he selects. The exclusion of sense-natures is therefore significant. Like Descartes himself, all his commentators and expositors I have read are content to declare that sense-qualities are excluded on account of their "confusedness", and that from confused terms no clear science can be developed.

7. But in a philosophy in which "confusedness" plays so important a part, there is good reason for insisting that the concept of confusedness itself should not be allowed to remain confused, but that pains should be taken to make it quite clear. For plainly confusion in perception is one thing, confusion in what is perceived quite another. Descartes does not, like so many of his empirical successors, confound perceiving with percept. To be sure, if percept be confused, perception *of* it will be so, but we cannot infer from our perceiving being unclear that what is 'given' to be perceived must be so. And Descartes certainly seems to regard both, perception and percept, as confused. What can be meant, then, by maintaining that all sensory qualities of percepts are confused? Neither Descartes nor his commentators explicitly deal with this question. But from the doctrine of simple natures elaborated in the *Regulae* we can find material for an answer. And his *Geometry* and the ensemble of his physical treatises provide cumulative evidence which Descartes would probably regard as justifying the exclusion. For the use of simple natures in these writings shows unmistakably that *the natures he names "simple" have a characteristic not possessed by sense-natures.* Both kinds of nature are determinable, non-complex, non-derivative, but there their similarity ends. All natures (simple or complex) suitable to serve as terms of explanation are either "absolute" or "relative" in relation to the series of propositions in which they appear and which constitutes the *demonstration* of the explanation in question (cf. *Regulae*, vi, xii). And the "absolute" term of any such series if not also a "simple nature" must be one that can be deduced (in another series of intuitions) from one or more natures that *are* "simple", the "absolute" term appearing in that latter series as not an "absolute" but a "relative" one, *viz.*, in relation to the absolute term which is a simple. Now in what consists the clearness of simple natures and the confusedness of sense-natures (as distinct from clarity and confusion in the *perception* of them, respectively) can be made evident by considering Descartes's view of the 'relativity' of relative terms, and the determinable character of relative terms and sense-natures alike. How is it that the confusedness of sense-natures prevents our elaborating bodies of science from and about them? The particularity and specificity of natural bodies is expressed quite as *definitely* by the determinateness of sense-natures as it is by the determinateness of its simple natures, the former 'announcing' the observable presence of those bodies, the latter defining their real character. The confusedness of sense-natures, then, cannot consist in their being indeterminate, for they are plainly as determinate in their way as simple natures are in theirs. Why deductive sciences can be constructed from and about the latter, but not from and about the former, would appear to be because *all natures that are important for deduction are such as*

fall into series each of which contains both 'absolute' and 'relative' terms, while natures from which a science cannot be deduced are such as cannot form series each containing 'absolute' and 'relative' terms. The variable values of a 'relative' term are always expressed in relation to some 'absolute' term taken provisionally as invariable. If our natures are "simple" (or complex ones wholly definable by simples) then any of them is suitable to serve as the absolute term of a series whose other terms are all "relative", and there are many relations discoverable connecting the former with the latter. A mechanistic physics consists essentially of propositions stating such functional variations and relationships. Now sense-natures are not of this kind. No selection from them will form a series of 'absolute' and 'relative' terms. There can be no relative terms among sense-natures because there are no absolute ones. No doubt, since each sense-nature is determinable, the determinates falling under it will be related *inter se*. But this shows only that they are *variable* natures, not that they are "relative" in Descartes's special sense. It does not show that they can be related to some "absolute term" which is also a simple nature, or which can, in turn, be related to another which is a simple nature. Consequently, systematic bodies of science (geometry, physics) expressing relations between determinate values of "absolute" terms and correlative values of "relative" terms, *can* be deduced from simple natures, but *not* from sense-natures. Hence, there are no sciences of colours and sounds as such, parallel with the sciences of shapes and motions. The simple natures to which bodies in motion are reducible thus make possible the discovery of laws connecting, *e.g.*, their volumes with their motions, in a way in which laws cannot be discovered connecting the colour, sound, temperature which sensibly appear as belonging to those moving bodies. How far-reaching are the consequences of this distinction between simple and sense-natures we shall see most fully when considering the views Descartes eventually regards as established concerning the nature of our Natural Knowledge and the character of all material existents and their changes.

8. If we allow provisionally all these requirements of his method, the way is open for Descartes to construct a thoroughgoing mechanistic account of Nature. This accomplishment depends upon two 'identifications', *viz.*, the reduction of all matter to space and the reduction of all vital activity to locomotion. Nature is to be exhibited as being in every respect and in every region one vast mechanism. All diversity in Nature is purely formal and quantitative. Accordingly, it contains no 'irrational' factors, but is so constituted as to be completely intelligible. What is regarded as an irreducible variety of chemical elements and modes of synthesis in inorganic chemistry are really so many parts of three-dimensional space occupying deter-

minate though relative positions and capable of a variety of motions differently directed and varying in velocity. Likewise, there are no ultimate qualitative differences among organisms. No property that an organism possesses persistently and independently of our perception will resist exhaustive analysis into a combination of some or other geometrical and kinematical 'natures'. So Descartes's biology, as well as his physics, is thoroughly mechanistic. And this is likewise true of those organic bodies that embody selves, *viz.*, human bodies.

III

9. It remains to examine critically the consequences following from these two wholesale reductions. In the first place, it follows that the identification of matter with space is to be regarded not only as a convenient postulate of physics but as a literal truth about the most ultimate character of all Nature, therefore as being a conclusion of metaphysics. To point out then, as we certainly may, that this identification (or substitution) has made possible more, and more important, results in physics than any other postulate except that of the conservation of energy, contributes just nothing towards establishing the certainty, or even the probable truth, of that metaphysical conclusion.[1] We may admit that so thorough a geometrization of matter has the advantage of enabling the physicist to avoid all dependence on "occult" qualities, powers, faculties or "substantial forms" in his explanations. But the value of this attainment is gravely compromised by the condition under which the avoidance is effected. The geometrical and kinematical natures into which Nature is analysed may well be all completely intelligible. But Descartes's account of the partitioning of the single substance that is all space into an array of separate, individual "bodies" (*res extensae*) persistently identical and interacting one with another, is surely as unintelligible as any "substantial form"! For the reduction of matter to space alone entails neither the existence of a plurality of particular bodies nor movement among them. The existence of a mode, it is true, entails the existence of its substance; but the existence of a substance does not entail that it has modes

[1] The ultimacy claimed for this metaphysical conclusion has, for its epistemological counterpart, the view that the sciences of pure mathematics and rational mechanics are *parts of* Philosophy. The facts that the laws of these sciences are adequate to explain are not phenomenal, but 'ontal'; to know these laws is thus to know the ultimate constitution of one part of the universe. Descartes's position is not that of an 'epistemological idealist', for though he holds that we are never directly apprehensive of Nature (in perception or in conception), there is a Nature independent of those ideas for its character and existence, to which they refer. The fact that there exists an independent Nature in this sense it was one of the principal aims of his metaphysic to establish.

(cf. God). And further, motion on the part of a mode entails that the mode is extended, for a mode to be of a certain shape or of a certain size does not entail that it must move. The motion of moving bodies, then, does not stand to the ultimate attribute of which those bodies are modes in the same relation as their determinate shapes and sizes stands to that attribute (*viz.*, spatiality). Hence for Descartes, both the particularity and the motion of natural bodies is extraneous to space. Though determinable into a manifold of determinate parts ("bodies"), space itself is not such a manifold. Its determinable character does not entail its actual determination into just those particular volumes (more or less regular cubes, spheres, etc.), each "constant", admitting of neither expansion nor contraction, which this, that and the other body we perceive really are, according to Descartes. The possibility of a partitioning and diversification of a homogeneous and individual space into a plurality of volumes each having its definite and constant quantity therefore remains to be demonstrated. Unless this is done, the reduction of matter to space is a futile proposal. It cannot be even a 'convenient postulate' for physics, for physics requires a plurality of diverse *res extensae*, and not merely an individual, homogeneous space. And even more futile would it be to propose the reduction as a conclusion acceptable to metaphysics.

10. So the partitioning of a homogeneous space into separate and diverse bodies, and the occurrence of various motions on their part, must be due to something besides the properties of space itself. And it is a stroke of creative genius in Descartes to have attempted to explain *both* numerical diversity (partitioning of space) and all types of change (*viz.*, of state, place and behaviour) by means of *one* principle. Since space is static, it cannot diversify itself; neither can it generate motions. And until space is diversified, there is nothing *to* move. Motion therefore must be imported into space, which, for Descartes, means that it must be "imparted" by God's volition.

But what is this language to mean? To be sure, the 'importation' or the "impartation" cannot be imagined, and we must not try to imagine it. But if this mechanistic metaphysic is to be rationally satisfying, the 'importation' must be conceivable, clearly and distinctly so. But in vain do we try to conceive it. So, though the attempt to explain numerical diversity, formal dissimilarity and change of bodies by means of one and the same 'nature' (motion) is a stroke of constructive genius, here again the value of the attempt is hopelessly compromised when the condition under which the diversity and change are asserted possible turns out to be one that we cannot clearly conceive. And this inconceivability announces further confusions, and indeed inconsistencies.

If we try the expedient of supposing 'God's imparting of a constant quantity of motion' to be only a seventeenth-century theological way of expressing what we to-day should mean by saying that it it 'just an ultimate fact' that where space is there is motion, actual or potential, then four things would follow. (i) The 'constancy' in quantity of motion in Nature (which Descartes claimed to 'deduce' as a necessary consequence of the constancy of God's will) will also have to be 'just an ultimate fact'. (ii) The 'ultimate fact' of motion in the world will be a 'brute' fact, and as such will express a limit to the demand of reason for satisfaction. And this should mean that its 'ultimacy' is self-evident. But if we reflect on the connexion between 'motion' and 'space' do we not find that motion is less ultimate than space? For it depends upon space, and not space upon it. And do we not also find that their connexion is neither necessary nor fully intelligible? (iii) To speak of "imparting" a constant quantity of motion to that which is not already and intrinsically 'in motion' is to fall back on a metaphor that is both vague and significantly applicable only to a 'microscopic' system, not to a 'macroscopic' one. For if it can mean anything to say that a constant quantity of motion is "imparted" to all space, it certainly does not mean anything which explains how all space should be partitioned into an array of spatial particulars. If, on the other hand, it is a microscopic system into which Descartes means motion to have been imparted,—so that what is declared "constant" is not an undistributed total of any sort, but a totality made up of *particular* movements, various distributed throughout all space,—then his 'explanation' involves a vicious circle. For, even theoretically, there could be no distribution of particular motions apart from the existence of particular bodies (modes of space) whose motions they are. Hence this interpretation presupposes a plurality of "bodies" existent. But it is motion that is supposed to effect the splitting up of the homogeneous substance that is all space *into* such spread of particular "bodies". Turn it about, then, as we may, this phrase of "God's imparting motion to matter" seems devoid of a meaning that is at once clear and consistent with Descartes's other assertions. The diversity and the identity implied in the conception of a multiplicity of individual bodies in motion turns out to have been only postulated; their existence has not been demonstrated, even within the provisions of his own theory of what demonstration consists in.

11. From this single space modified into an indefinite number of volumes ("bodies"), Descartes deduces three consequences of far-reaching importance; *viz.*, that there are no atoms, no vacua (empty spaces) and no bodies that contract or expand. Just as Nature conserves throughout time the total quantity of motion originally transmitted to it, so each body conserves throughout time, without

increase or decrease, that definite quantity of space which defines its volume. From Descartes's peculiar conception of matter, these three consequences follow logically enough. But, we shall see, when the implications of the notion of a persistent and interacting natural body become explicit, as they do when he attempts explanations of relatively determinate types of physical behaviour, he is compelled to introduce explanatory characteristics incompatible with the purely formal determinations of extension and motion.

Since there is one dimension which is 'the' dimension of each body, no body can literally expand or contract. Yet it is convenient to speak of bodies contracting and expanding, and a suitable meaning for such speech can be provided within the terms of our purely geometrical Nature. To speak of a gas or a sponge as "expanded" presupposes that not one but many bodies are in question. The particles of the body "expanding" have been separated by greater distances than those which separated them previously. Consequently, the interstices between those particles have become filled with *other* matter. Thus in expansion there is no alteration in the real, defining extension of the "expanded" body, only a displacement of its component parts. And that a vacuum is impossible is evident directly matter is identified with space. The conclusion that there can be no region of space unfilled with space is self-evident. All we may mean by "empty space" then is space unfilled with its previous or with expected content. And since there are no 'gaps' or 'interstices', space is a continuous *plenum*, and infinitely divisible. Therefore there can be no atoms, for an atom, though imperceptibly small, would have some extensity, and so set a limit to the divisibility of space.

12. Now such a literally absolute geometrization of matter as this shows that, quite apart from Descartes's failure to explain individuation of space into bodies by motion, any possible attempt to do so *must* end in failure. For there is nothing in the merely determinable character of space to preclude any number of identically determinate modes from co-existing coincidentally. Given, say, a cubical or spherical body of definite extensity, there could be any number of other cubes or spheres simultaneously coincident with it, any one of which may as legitimately be accounted a 'particular body' as any other. But one characteristic of everything that is 'a body' is that it excludes the simultaneous presence of another. Yet argument by congruence of properties in geometry proceeds on the assumption that any number of coincident figures can co-exist in the same space. So even had Descartes's account of the partitioning of space accounted satisfactorily for the *particularity* of particular *res extensae*, he would still be far from having fulfilled the minimum requirements of a theory theoretically capable of explaining the simplest types of mechanical change occurrent to natural bodies. For all the reduction

really allows him (as distinct from what he *supposed* it gave him) is a static 'spread' of a quality that *could* be split into a number of volumes having definite quantity and a definite boundary, each of which is necessarily of infinite divisibility and each of which *could* stand in different spatial relations to others at different dates. With so little as this provided, it is plainly impossible to explain even so simple a natural occurrence as a particle moving in a straight line. For even though motion is "relative" for Descartes, it is the *same* particle that must be differently situated at different dates, *i.e.*, the determinate quantity of extension and determinate configuration which define the particle originally must persist through the time the body is said 'to be moving'. Such persistence is as essential as particularity and determinateness to the individuality of 'the' body. But if we add to space the further 'static' characteristics of determinateness and particularity, still 'persistence' cannot be defined by them. This character required in order that a *res extensa* should not merely 'be so-and-so' but should "remain constant" throughout indefinite time, is unavoidably introduced by the further, non-geometrical consideration that motion in time occurs to *res extensae*. But again, though kinematics requires persistence in particles, that persistence cannot be deduced from either simple nature, "motion" or "extension". To be sure, "unity" and "duration" are equally simple natures with these, and Descartes's metaphysics assures us that both pairs express genuine characteristics of Nature. All four are distinctly conceivable. Unity, however, is one thing, duration another. And 'to preserve the same unity throughout duration' is other than both. Yet it might be held that from 'unity *and* duration', 'unity *in* duration' is deducible. If, then, this is Descartes's real justification for supposing a plurality of particular, determinate and persistent bodies for his kinematics then we may agree that the supposition is provided for by the principles of his metaphysic. But it is not provided in the way Descartes himself asserts, for it is not provided by the existence of God and his volition, nor by space alone, nor by space and motion alone, nor by all together. Hence the declaration, "Qu'on me donne l'étendue et le mouvement et je vais refaire le monde" is, even for a Cartesian, an impossible boast.

13. Not only is the way in which Descartes tries to establish the persistence of *res extensae* unintelligible and unacceptable (though it can be established intelligibly and legitimately), but he speedily forgets the purely geometrical character of his Mechanism in his physical treatises, and assigns further characteristics to *res extensae* which cannot be justified from the provisions of the "mathématisme universel". For though the reduction of matter to space be so interpreted as to allow for persistent particulars, it cannot be interpreted to allow for a matter consisting of particulars that are relatively

active and passive in their transactions. Yet, as Leibniz pointed out, the language of impact used by Descartes in his physics and presupposed by his laws of motion, involves more than persistence. It requires also 'resistance', and this requires 'force' or 'energy' of some kind as its ground. It was probably in his anxiety to avoid anything that could be suspected of being a "substantial form" that led him to regard motions as occurring without expenditure of energy. Potentialities, however, must be included among the minimum of explanatory characteristics, besides determinable natures. For in his physics, Descartes speaks of motion being *transferred* from one body to another on the occasion of their "impact" (*choc*) in a manner that certainly implies that bodies expend energy. It is plain that "motion" is being used here equivocally; *viz.*, as the *cause* of a given change of place (*i.e.*, as "force") and as *the change* itself (*translatio*) which is effect. And although we do not commit the all too easy blunder of *imagining* 'microscopic' motions on the analogy of 'macroscopic' ones (*e.g.*, like the sensibly apparent movement of a marble travelling along a surface), still, the double sense of motion as "impelling force" and as "change of situation" remains. What then *has* God "imparted"? If only capacity or motive force, then its actualization into discrete motions is not, and cannot be, accounted for by a wholly geometrical Nature. If it is actual motion, then bodies are devoid of energy and it is senseless to speak of "impelling forces" and change due to "impact", for this will be the language of substantial forms. If both have been "imparted", then motion is not a simple nature and not a nature distinctly conceived, but no more than two images (*e.g.*, of 'muscular effort' and 'sensible movement'), therefore emphatically something confused.

14. For these reasons we should doubt gravely whether Descartes's metaphysics of Nature could give the complete rational satisfaction he promised, however felicitously the geometrization of Nature might work out in detail. But as we pass from bodies of less to those of greater complexity in organization and function, we find the geometrization ill fitted to explain the concepts through which biological changes are described. From the first major identification of matter with space, a second great reduction follows. All variety and complexity exhibited in the behaviour of *animate* bodies, or inferable from it, is identified with sets of integrated motions occurrent in relatively permanent groupings of *inanimate* bodies, *viz.*, in the animal's organs. This reduction of vital activity to movements in space is, of course, already contained in the methodological postulate and metaphysical principle that all change is 'mechanical'. Mechanism therefore commits Descartes to explaining to the veriest detail every type of change occurrent in every kind of living body (*e.g.*, anatomical, physiological, habitual, instinctive, sensory and imaginative) in

terms of reactions that are movements on the part of organs or glands or of fluids such as the blood or "animal spirits". The anatomy and physiology of this Natural Philosophy are thus all in line with, and extend, its celestial and terrestrial physics. The animate body or "machine" is differentiated from inanimate matter in no essential respect. No "vital" or "organic" characteristic may be introduced, for this would be to deliver up natural science to a detested "substantial form"! Animate body differs from inanimate only in involving the more frequent occurrence of regular kinds of interaction between its parts, hence in involving a much greater degree of interdependence between those parts. The modes of reaction characteristic of organic bodies, usually involving chemical natures—flexion of limbs, contraction of muscles, pumping by the heart, digestion by the alimentary canal, secretion by the liver, etc.—may well be mechanically explicable along lines analogous with those by which expansion and contraction in inanimate bodies were explained. So, too, bodily fluids may be susceptible of treatment analogous to that of light and heat. Whether such changes and more complicated ones are explicable 'mechanistically' is matter of dispute among contemporary physiologists. But even the 'mechanists' among them would require a much more elaborate and less 'pure' form of Mechanism than that which Descartes envisaged. Descartes, however, cannot dispense with such physical characteristics as resistance, impact, expenditure of force, and these, we saw, are but foreign currency in a wholly geometrical Nature.

The objections to Cartesian mechanism culminate and show up most convincingly in his account of those animate bodies that embody selves. His psycho-physics is principally concerned to explain the bodily consequences of volition (*i.e.*, the self's apparent action on its body) and the causation of perceptive and affective experience (*i.e.*, the apparent action of matter on the self). The explanations require that, in the latter case, after a series of nervous excitations have occurred, a mechanical impress is made on a central physical organ (the pineal gland), whereupon there ensues an event that is not physical but mental. How this should be possible if matter and mind are totally disparate and not interactive, we need not now inquire. In one particular class of cases, *viz.*, human bodies, a connexion more than temporal and less than causal does, Descartes maintained, relate mental states and bodily changes. His explanation does enable us to substitute for the imprecise question, "How can there be a 'substantial union' of a conscious substance with a mode of matter?", the seemingly preciser one, "How can a conscious substance be 'continually present to' the pineal gland?" But the reformulation facilitates no solution. Is not the "presence" as unintelligible as the "union"? Since the self is not extended or spatially situated, to

speak of it as being "present to" the pineal gland, or of that organ being "the seat of the soul", is to speak in misleading metaphor, since its meaning rests on an analogy whose terms are perforce both spatial.

15. The implications of the conceptual reduction of matter to space on the one hand, and the implications of what is taken to be disclosed in sense-perception on the other, instead of being mutually supporting, openly declare their incompatibility, and therewith demand the rejection of mechanism. Descartes regards the existential and qualitative distinctness of self and body to be a distinction in fact—a "real distinction" and not a "distinction of reason". A metaphysic that is rationally satisfying must therefore preserve in all its particular explanations the full import of their distinction. Now, that the two partners in this substantial union are *necessarily* distinct (in character and existence) is certified by resort to sensation. But sensation, on Descartes's view, is possible only because self is united with a body. Their "union" however is not distinctly conceivable but only confusedly felt. This being so, one wonders how any piece of certain knowledge could be based upon it. Descartes certainly maintains that sensations really occur, he denies only that they are ever clear. The sense-natures sensed in those states are intrinsic to them as "confused" states, therefore the qualitative characteristic must be taken seriously. But, although the introduction of embodied selves is a necessary condition for explaining the *de facto* 'qualitas' of sensation, it is not a sufficient one. For that 'qualitas' can be explained neither by matter nor by mind. There is no intelligible relation between moving particles and the 'qualitas' on the one hand, nor between activities of pure conception and volition and the 'qualitas' on the other. Since natural bodies are wholly formal and quantitative, how should they appear to be characterized as they are not? And since the only cognitive activity of the self is conceptual, how should the self be able to "suffer" such confused affections? The confusedness of sensory awareness cannot be accounted for by the nature of either partner in the transaction, so its occurrence must be regarded as inexplicable or as 'an ultimate fact'. Such a result must clearly be a grave defect in a metaphysic designed to provide rational satisfaction. Since the 'qualitas' exhibited in sense-natures is essential to sensations, and since the occurrence of sensations constitute the situations that evoke pure thought activity, Descartes may agree with Kant that all knowledge begins in sense-experience, but not that sense-experience ever contributes anything to that which is known. And since sense-natures are due neither to the self nor the body, but to the *embodiment* ("substantial union") of self by matter, sensation must be regarded as 'emergent', and (in common with the 'embodiment') as

totally unintelligible. So much Descartes is compelled to admit. We know *that* self and body are connected, but not *how* they are connected. And here, surely, inconsistency overreaches itself, for, in his letter to Elisabeth (1643) Descartes had assigned to "the union of soul and body" a place among the simple natures! What we have, indeed, under cover of a simple nature, is the undisguisable presence of a full-blown "substantial form", entrenched in the very citadel of Cartesianism.

In the end, then, the collapse would seem as complete as collapse could be. Is it not peculiarly ironical, therefore, that a majority of Descartes's admirers should select his universal mechanism as attesting his principal merit in metaphysics?

GOETHE'S PHENOMENOLOGICAL METHOD

Professor FRITZ HEINEMANN

Eleusis servat, quod ostendat revisentibus.
"Ich denke auch, die Behandlung ist gut; es ist Methode darin."
(To Eckermann, February 1, 1827.)

Nothing makes the occupation with the great minds of the past more attractive than the fact that with the change in the whole situation of the present time, with the maturing of one's own personality, they appear in a new light and present themselves in rejuvenated shape. I had a curious experience of this kind, when it occurred to me during the investigation of some phenomenological problems, that Goethe, though ignorant of the name, had employed a definitely phenomenological method. In occupying myself now with the revealing of this fact, it will be my leading principle to understand Goethe through himself, and I shall try not to adapt his meanings to my own theories. This is a principle which many of the critics have transgressed, notably the author of the most thorough analysis yet undertaken of Goethe's *Urphänomen*."[1] I cannot start from this very able writer's premise that Goethe's *Urphänomen* is identical with the Platonic Idea, nor can I assume with her that his method was not empirical but idealistic, since it produced its object as an Idea. We must forget both Plato and the contrast of empiricism and idealism; for what Goethe meant by the *Urphänomen* can only be cleared up from the whole of his teaching concerning phenomena. What, then, was Goethe's phenomenological method?

We shall understand it best if we contrast it with other modes of procedure to which it is opposed. So far is Goethe from finding his starting-point in pure thought, and educing its object from it, that he scoffs at men who begin with a theory and only afterwards go on to examine experience. "Theories," he says, "are usually the rash utterances of an impatient intelligence, that would gladly be done with phenomena, and so puts in their place images, concepts, even words. One suspects, one even sees, that this is a mere makeshift; but are not passion and partisanship always lovers of makeshifts? And rightly so, since they need them so thoroughly."[2]

[1] Elisabeth Rotten, *Goethes Urphänomen und die platonische Idee*. Giessen. 1913.

[2] *Goethes naturwissenschaftliche Schriften*, ed. by Steiner, Vol. IV, Part 2, p. 376; referred to subsequently as St.

"Theory as such is of no value, except in so far as it enables us to believe in the interconnection of the phenomena."[1] The mind does not apprehend the essence of things, but it substitutes symbols, images, concepts, for reality, which in themselves are senseless if they do not refer to what is real. Only for him who is in possession of the phenomena is theory of value as revealing their connections.

Hypothesis, as the foundation of theoretical physics, as it was first developed by the atomists, falls under the same condemnation. "Hypotheses are lullabies with which the teacher soothes his pupils to sleep. The thoughtful and faithful observer grows increasingly conscious of his limitations, for he perceives that the more knowledge extends the more numerous are the problems that emerge."[2] "To rid the human mind of an hypothesis that has unduly restricted it, forcing it to observe erroneously and to combine falsely, to muse instead of seeing, to sophisticate instead of judging, is already to render it an inestimable service. Henceforth it sees the phenomena with greater openness of mind, in other relations and interconnections, orders them after its own manner, and once more gets the chance to err after its own manner, a chance that is invaluable if it soon succeeds in perceiving its error."[3] He recognizes, of course, that science cannot proceed without hypotheses, but he regards them as a scaffolding which should be taken down when the building is completed, and which must not be mistaken for the building itself. Newton's "hypotheses non fingo" is repeated to ensure the mind's freedom of aspects: "All hypotheses hinder the *ἀναθεωρισμός*, the reconsideration of the phenomena in question, their examination from all sides."[4]

This examination from all sides is essential, because phenomena are inexhaustible, infinite; hence every mode of representation (*Vorstellungsart*)—and this includes theory, hypotheses, system—represents a limitation that is undesirable. It would, however, be a complete misunderstanding of Goethe to interpret him as wishing to dispense with all such modes of representation. On the contrary, he endorses Schiller's remark[5] that "the natural sciences have hitherto erred in two directions: in confining nature within the limits of their theories, and in allowing objects to restrict the powers of thought." This is not the indecision of weakness, of inability to realize himself and to reach the essence of things, but of strength, of the deep insight, that no one perspective, nor one man, but only the total perspectives of all mankind can suffice for the apprehension of truth. His remarks to Reinhold: "In the course of time every possible opinion presents itself to us, partly as productive, partly as historical," and to

[1] *Op. cit.*, p. 357. [2] *Op. cit.*, p. 358. [3] *Op. cit.*, p. 359.
[4] *Works*, Weimar edition, Section II, Vol. 13, p. 441, referred to subsequently as W.A. II. [5] In a letter dated January 12, 1798.

Jacobi: "I for my part, considering the many different tendencies of my being, cannot be satisfied with one single mode of thought," define the universality of Goethe lying midway between the architectonical-creative universality of the great "uomo universale" of the Renaissance and Hegel's constructive-historical universalism, which apprehends every shape of nature and history as a moment in the one metaphysical process. It is, in other words, a universality of observation, and examination of things from all sides. It is in this freshness of outlook, this diversity of aspects, and inexhaustible wealth of observations that Goethe's greatness lies. No metaphysic, no system arises in this way. Goethe would emphatically repudiate both—but just as little does it end in a mere chaos of aphorisms; rather are all his utterances, as phases of one concentric world, supported by a single constructive law.[1]

Goethe's scepticism is directed against theory, against hypothesis and other modes of representation, against the proneness of weak minds to generalize rashly from a single observation. But its deeper significance first becomes apparent from his rejection of the quantitative method, for thereby it repudiates the standpoint of exact science in Europe since Pythagoras. In sharp opposition to the belief which, through the influence of Descartes, has become the ruling principle of modern thought, namely, that it is the task of science to substitute quantitative descriptions for qualitative ones, he puts the antithesis: "It is a false notion that a phrase or a mathematical formula can ever take the place of, or set aside, a phenomenon."[2] "A phenomenon that cannot be measured still remains a phenomenon."[3] This does not mean that the mathematical method is dispensed with. On the contrary, it is treated with the greatest respect; it is even extolled as the model of scientific method.[4] What is denied is simply its claim to be the *sole* instrument of scientific knowledge. The real motive of Goethe's opposition to it is his desire to preserve the phenomenal datum in its living, unanalysed concreteness, in its quality. The fundamental difference between Goethe's science and mathematical science is that it is qualitative, not quantitative science, that it leaves the qualities in themselves intact, that it does not reduce them to quantities. And should his science prove false in most of its assertions, it would still have its methodological significance in this regard. It is the presupposition of the mathematical view of the world that all possibilities of order must be merely of a formal nature. As against this Goethe's view rests on the implicit assumption that there are, besides the mathematical

[1] How near Goethe actually comes to Hegel's historical conception may be gathered from an interesting remark to Schiller, in a letter of January 24, 1798 (*Recl.*, Vol. II, p. 242).

[2] W.A. II, Vol. 11, p. 98.

[3] Letter to Schiller, referred to above.

[4] W.A. II, Vol. 11, p. 78.

and logical orders, others grounded in the nature of the contents. At any rate, the place of Goethe's science on the "globus intellectualis" is only to be fixed after having recognized the need of a basic science of content.

It follows as a necessary consequence of this rejection of quantitative physics that Goethe's investigation cannot be a causal one, but must refuse to regard the causal principle as the ruling principle of order among phenomena. Not that he ignored the concept, as Emil du Bois-Reymond accused him of doing; indeed, he regarded it as "the most-innate, most essential of notions." But he saw, as Schiller expressed it, that "with regard to relation it is the everlasting aim of Rationalism to ask for the causality of phenomena and to connect everything as cause and effect, a most commendable and necessary undertaking for science, but one that also may become pernicious through one-sidedness. I am referring here to your essay criticizing above all this abuse of the search for the causal determination of phenomena. Rationalism seems to fail here chiefly through the scantiness of its survey, which embraces only the length, not the breadth of nature."[1] It was Goethe's desire to survey nature in its breadth as well as in its length, and not to destroy the indivisible phenomenon by a false abstraction of the understanding, which treats as separate factors a cause and effect that actually constitute a single process. "Man in thinking errs particularly when inquiring after cause and effect; the two together constitute the indissoluble phenomenon. He who recognizes this is on the right path to effective action." "It is rightly said that the phenomenon is a consequence without a ground, an effect without a cause. It is hard for men to find causes and effects because they are so simple that they elude their view."[2] He associates himself here with the Greeks, who never spoke of causes or effects in their descriptions or reports, but simply presented the phenomenon itself.[3] If the predominance of the concepts of cause and function in modern European thought has resulted in the loss not merely of the *notion* of substance but of the substantiality of man himself, this is clearly an attempt to restore to man his heritage of substantial being. Hence the question here asked is not what are the causes, but *what are the conditions under which the phenomena appear*. Their sequences and antecedents, their recurrence in innumerable different circumstances, their sameness and their diversity, are observed and admitted, their determinations are recognized and determined again by the human mind.[4]

[1] Letter, dated January 19, 1798.

[2] St., Vol. IV, Part 2, p. 372.

[3] W.A. II, Vol. 11, p. 370.

[4] Cf. *Erfahrung und Wissenschaft*. See Heynacher: *Goethe's Philosophie aus seinen Werken*, p. 159.

This negative attitude, the refusal to begin with theory or hypothesis, term, concept, or mode of representation (*Vorstellungsart*), with number, mechanical motion, or causality, determines at the same time the positive direction of Goethe's inquiry.

(1) *His method is phenomenological, firstly, in starting with the phenomenon itself, i.e.* with the empirical phenomenon as it is given in sense-perception, when, for example, we observe under certain determinate conditions the colours that appear on a white screen when the light is refracted through a prism. These empirical phenomena are in the first instance naïvely accepted, or are at least not subjected to critical reflection. The standpoint is thus definitely empirical, though it is better not to prejudge it by labelling it *Empiricism*, as Schiller did. It is not hellenic, nor mediaeval, but specifically modern. Goethe agrees with the Positivists in his demand that men shall confine themselves to the knowable and begin with as exact a description of the phenomena as possible, as he does also in his concept of truth, but he parts company with them in his desire to maintain the phenomena as they are, and not to resolve them into quantities or analyse them into their simplest elements ("simple ideas"), and notably in his refusal to give the central place to the concept of relation. In starting with the phenomenally given, he is associating himself with Kant, though also differing from him. Both insist that knowledge begins with experience, yet does not arise out of experience.[1] And it is evident that Goethe has in mind Kant's doctrine of the independent activity of mind over and above the given matter of sense, when he emphasizes the creative independent force of mental powers by which experience is ordered and formed. Yet the two differ essentially in detail. Kant begins with the chaos of sensations, out of which the mind constructs a world by its immanent principles of order. For Goethe, on the other hand, experience is no brute fact, but has already from the first an immanent order. The subject is not opposed to its object, for it is not yet distinguished from it. Goethe lives in the perceptually given, at a level at which the two are not yet separated. The process of knowing consists for him in a progressive clarification of this material, in which "every seeing (*Ansehen*) becomes an observing (*Betrachten*), every observing becomes a meditating (*Sinnen*), every meditating becomes a connecting (*Verknüpfen*), so that we may actually be said to theorize whenever we look at the world attentively."[2]

The complex and difficult question "Goethe and Kant" cannot be solved in an incidental manner. But it is important to recognize that, despite their similar points of departure, the two move on entirely

[1] W.A. II, Vol. 11, p. 49.

[2] *Vorwort zur Farbenlehre*, W.A. II, Vol. 1, p. xii.

different planes, have different aims, directions, and interests. The fact that after a notable alternation of approaches and recoils, Goethe finally rejects Kantianism, because it is not able to reach the object, indicates the real difference in their points of view. Goethe lives in devotion to objects; he seizes them, they possess him. What he says of Rahel, that she did not judge of objects, but seized hold of them, is more profoundly true of himself. To begin with the phenomenon means, for him, to begin at a level at which subject and object are one.

Goethe holds that men have so far neglected the nearest thing. This nearest factor he supposes to be the appearance of which we are ourselves aware at any moment, and of which we might demand that it should explain itself if we penetrated deeply into it. Colour, for example, has been overlooked as an elementary natural phenomenon. "Do not look for something behind the phenomena; they themselves are the doctrine." "The highest point of view would be to recognize that all fact is already theory. The blue of the heavens makes known to us the law of chromatics."[1] An attitude of deepest modesty is expressed in the words: "To be equal to objects in their whole breadth means learning; to penetrate their depth means discovering."[2] Never have phenomena been considered more seriously nor been perceived in greater abundance.

(2) *Goethe's method is phenomenological, secondly, in proceeding through phenomena.* This procedure follows a definite rule. Even its starting-point is not indifferent, for not every phenomenon affords a suitable beginning. "Phenomena are of no value unless they yield us a deeper or fuller insight into nature, or unless we can apply them to some use."[3] Their value lies in their fruitfulness, either for knowledge or for action. Here, however, the question arises: What makes the phenomenon reliable? To this Goethe replies: "*One* phenomenon, *one* experiment, proves nothing; it is but a link in a longer chain, that has significance only in a whole. . . . No phenomenon is self-explanatory; only a larger number, viewed as a whole, methodically ordered, yield at least something that could rank as a theory."[4] By the production of an ordered sequence of phenomena what is subjective is eliminated, and what is objective is reached. *Goethe's phenomenological method is unique in this sense, that it is at the same time an experimental method, experiment being the link between subject and object, between concept and nature, between concept and Idea, and that it goes beyond the empirical phenomenon to the scientific.* Experiment is here understood as the deliberate repetition of experiences that we ourselves, or others before us, have had, "the restoring of phenomena that have occurred, either by chance or by design."[5]

[1] St., Vol. IV, Part 2, p. 376. [2] W.A. II, Vol. 13, p. 444.
[3] *Op. cit.*, p. 368. [4] *Op. cit.*, p. 375. [5] Heynacher, p. 135.

Experiment has thus to assume the function of guaranteeing the phenomena. The isolated information furnished by a single phenomenon is rendered certain by repetition.[1] Its function is not the verification of an hypothesis, but simply clarification, the bringing of data into evidence. It is the increasing (*Steigerung*) of observation, and, by overcoming the isolation of the single observation, it accomplishes the transition to a higher level of experience. Since all things in nature stand in a constant relation of reciprocal causation, every phenomenon being connected with innumerable others, the phenomena most closely related to it must be produced, in order to exhibit *one experience* in all its possible aspects. The same experiment must therefore be performed under as many varying conditions as possible. In accordance with Liebniz's famous principle of continuity, each phenomenon is linked to its nearest, and experiences of the first and second levels are thus ordered in series. The experiences of higher levels which result consist of several others. "They represent the formulae for innumerable single calculations."[2] Thus the opposite dangers of exaggerating the significance of a chance combination of elements, and of overlooking an essential connection are avoided. "That order is the best in which the single phenomena become, as it were, one large phenomenon, whose parts stand in reciprocal relation."[3] Spinoza's substantial monism (*Monosubstantialität*), itself a phase in the decline of monotheism, is transformed into a mono-phenomenalism, which demands that the multiplicity of phenomena be regarded so far as possible as *one* phenomenon.

This unification, being a concrete one, involves the difficult condition of exhaustiveness. "I became convinced from investigations in physics that it is the observer's first duty to discover every condition under which a phenomenon may occur, and to aim at the completeness of the phenomena, since they actually form a series, or rather are forced to interpenetrate, so that they will present themselves to his observation as an organization manifesting an inner life of its own."[4] The conditions under which the phenomena appear are thus varied, in order that the entire range of their appearances may be discovered. Since nature is one, the phenomena through which it presents itself to us must have an inner connection. An internal organization must become apparent among them, which therefore we do not introduce (it is not the understanding that gives laws to nature, as Kant asserts), but which we discover in it. "To exhibit the total range of the appearances is the only way of getting beyond partial explanations, of banishing them."[5] The elimination of partial explanations is not, however, the aim; it is merely a means

[1] *Op. cit.*, p. 136. [2] W.A. II, Vol. 11, pp. 43 and 28. [3] *Op. cit.*
[4] *Op. cit.*, pp. 48, 49. [5] W.A. II, Vol. 5, Part 2, p. 9.

to obtain the knowledge of what is constant. "The constancy of the phenomena is the one important thing; what we think about them is quite irrelevant."[1]

This transition to the higher phenomenon through a complete survey of the appearances, revealing their constancy, is at the same time the advance to law. The tentative character of this advance will be apparent from the following fragment:

"Phenomenon
experience . . . . . test empirical
law . . . . . test theoretical
cause . . . . . test transcendental

The way they succeed each other is the right one."[2] Thus the empirical test is the medium of transition from phenomenon to law, or from observation to conception.

Goethe's experiment derives its peculiar character, not from its method alone, but also from its connection with the human body. He believes that man, when he has the normal use of his senses, is the finest and most exact of physical instruments, and that the modern physicist has done a real injury to science in divorcing experiment from man, and attempting to explore nature only by artificial means. Here, however, a difficulty arises which we meet again at the last stage of the inquiry, viz., that the way lies through phenomena to a phenomenon of a higher order, but that this latter must be expressed in brief, easily comprehensible statements, comparable to those of mathematics.

(3) *Goethe's method is phenomenological, thirdly, in ending with the phenomenon.* Here, too, it stands in the closest relation to modern thought. Its goal is pure experience. "Who can claim to have an inclination for pure experience? All men believe themselves to be doing what Bacon so strenuously urged, but who of them has succeeded?"[3] To reach the pure phenomenon is not easy, for it is not given, but is concealed by the various accidents of mental temper, organic conditions, atmosphere, light, temperature, etc.

To recapitulate, then, we have distinguished the following levels in the phenomenal: (1) The empirical phenomenon, which we all perceive in nature, and which is converted into (2) the scientific phenomenon, by means of experiments in which it is presented under circumstances and conditions different from those under which it

[1] W.A. II, Vol. 13, p. 444.
[2] *Op. cit.*, p. 454.
[3] W.A. II, Vol. 13, p. 442.

was first observed, and in a more or less happy sequence. (3) The pure phenomenon is the final result of all experiences and experiments. This can never be isolated, but is revealed in a constant sequence of appearances. To present it the human mind gives definiteness to the empirically fluctuating, excludes the accidental, rejects the impure, unravels the confused, even discovers the unknown."[1] This is merely a clearer analysis of what we have already shown. The pure phenomenon is the purified, clarified, constant phenomenon that is apprehended by pure intuition.[2] Like the Hegelian Absolute, it lies at the end of the inquiry, not at the beginning. It is the final result of experience and of experiment. It lies beyond the external, empirical data, for it is that which appears in them, that which is revealed in a continuous series of appearances. It is the form that persists through the alternation of the species, constantly recurring, yet presenting a thousand variations. The relationship to Hegel is closer here than is apparent at first sight; for Goethe's pure phenomenon is also Idea. For him concept is a summary, but Idea is the product of experience. For both a mental process is comprehended in the Idea, for the one a perceptual, observational one, for the other a process that is at once historical and reflective. But the fundamental difference remains that for Hegel the movement (*Gang*) of reflection is the movement of the thing-in-itself. "Quantitatively," Schiller points out, "the pure phenomenon must include the totality of the instances, for it is what is constant in all of them." Qualitatively, we might add, it is the Idea.

Only at this stage is it possible to understand what is meant by the "*Urphänomen.*" It is the pure phenomenon; yet not every pure phenomenon may assume this title, but only the purest. It is also referred to as the "basic phenomenon" (*Grundphänomen*), the "basic experience" (*Grunderfahrung*), or the "original experiment" (*Urversuch*). Its primary function is unification. An innumerable multitude of phenomena is embraced within its unity, and becomes apprehensible through this synthesis. "Urphänomene" are basic phenomena, "in which the manifold can be contemplated."[3]

Thus in being one and undivided they are simple. "We must learn to see that what we have seen and recognized in the most simple must also be supposed and believed in the complex. For the simple conceals itself in the manifold."[4] But the simple is not, as with Descartes, the result of analysis; it is what is apprehended in the simple glance of a purified perception. If experiment and the synthesis of a series of experiments in one fundamental experience are

[1] W.A. II, Vol. 11, p. 40.

[2] In this respect Goethe's theory is a theory of pure intuition, not of pure reason (like Kant's), or of pure knowledge (like Hermann Cohen's).

[3] Letter to Chr. v. Buddel. [4] Letter to S. Boisserée, February 25, 1832.

the means of guaranteeing experience itself, its warrant is not the *cogito* of Cartesian or Kantian rationalism, it is intuition (*Anschauung*)—additional evidence of the far-reaching divergence between Goethe and Kant. Their bases are entirely different. Kant could never have said: "It is blasphemy to talk of an optical illusion."[1] "The senses do not deceive; it is judgment that deceives."[2] "Man is adequately equipped for all his genuine earthly needs if he will trust his senses, and develop them in such a way that they continue to prove worthy of his confidence." The basis of knowledge is thus trust in the senses, not, however, in experience as such, but only in the experience that survives the process of purification. The most certain is "that which recurs in the appearances again and again in uniform connection, thus indicating a constant rule."[3]

Albeit the *Urphänomene* are said to fulfil these functions of unification, simplification, and validation *by virtue of being phenomena*, it will be clear that they thereby transcend the sphere of the merely phenomenal. The transition from the phenomenon to the *Urphänomen* has thus the following implications: (1) That "experience is only half of experience," *i.e.* that he who desires to attain to knowledge cannot rest in one phenomenon.

(2) That such a transition must take place first of all *within the phenomenon itself*; it must reveal the connecting principles that are concealed within it, and require to be exhibited.

(3) That the free activity of mind is required to effect this transition, for nature does not reveal itself to an unintelligent stare, but only to a mind that is able to break through its surface appearance and penetrate to its depths.

(4) This transition can be effected because every phenomenon is more than a phenomenon.

An appearance is always an appearance of something. It is particularly necessary to be reminded of this to-day, when Positivism has divorced the appearance from its ground and has substantialized it. "Something appears" means that *something* comes upon the scene. This *something* is contained in what appears, but it is not exhausted by it. A man appears. The human entity that appears in this man, *qua* infinite, cannot be completely presented in any single appearance. Moreover, even such an appearance implies more than this one man, for it also represents a species of men, *e.g.* the miser. "Every existing thing is an analogue of all that exists."

But what is it that appears in the appearances? In the first place, not things-in-themselves appear in them, for Goethe recognizes no independently subsisting things-in-themselves. Riemer has preserved an interesting communication,[4] pointing out that man can

[1] W.A. II, Vol. 5, Part 2, p. 21.
[2] St., Vol. IV, Part 2, p. 349.
[3] W.A. II, Vol. 12, p. 106.
[4] Dated August 2, 1807.

never express the whole nature of anything. "To know nature he ought to be nature itself. What he is able to express of nature is always something specific, *i.e.* it is something real, something actual, namely, something in relation to himself. But what he expresses is not all that it is; it is not its whole nature. This may serve as an explanation, and concession for those who still speak of things-in-themselves. Although they can say nothing of things-in-themselves just because they *are* things-in-themselves, *i.e.* are out of relation to us and we to them, and because we recognize everything that we say to be our own mode of representation . . . it is evident that they at least agree with us that what man can predicate of things does not exhaust their nature, that they are not simply and solely what they are thus said to be, but much more, and much else. . . . In other words, things are infinite in their natures. Man in expressing the object is below and above it, man and God, reconciled in one nature. We should not speak of things-in-themselves, but rather of the One-in-Itself. For 'things' exist only from the human point of view, which posits a diversity and a multiplicity. All is actually only one, but who is able to speak of this One as It is in Itself?" Appearances are not appearances of things-in-themselves, because there are no such things: things are merely the fragments into which our human weakness breaks up reality, wrongly representing the infinite in this finite form.

The One-in-Itself is the centre of this world view. *Urphänomene* differ from ordinary phenomena in manifesting the One in a specific manner. In them the creative and synthesizing forces of the universe become apparent in an unusual way. This Theory of Ur-phenomena is so difficult, because the term covers many—at least seven—different meanings:

(1) The Ur-phenomenon is an appearance, for it appears, as an image, if not to the outer at least to the "inner eye."

(2) The Ur-phenomenon is the thing that appears (*das Erscheinende*), in so far as it does appear. If we take it, not in isolation, but in relation to the class of phenomena with which it is associated, it *appears in* these.

(3) The Ur-phenomenon is the thing that appears, in so far as it *cannot* appear, because it is infinite, and thus exceeds what can be included in a single appearance.

(4) The Ur-phenomenon is that which *becomes apparent, i.e.* it is that which is in transition to actual appearance, and thus connects the appearance with that which appears. The two factors just distinguished here coalesce. The term phenomenon thus receives a new meaning: it is that which appears (*das Erscheinende*), that which comes to appearance (*das in die Erscheinung Tretende*), which exhibits its nature, which reveals itself by itself (*das sich von sich*

selbst her Zeigende). We might call this the Christological aspect of the phenomenon, for the Word made flesh has here become the Word made phenomenon. This becoming is both fact and symbol. "A symbol is the fact without being the fact, and yet the fact, an image, focussed in the mirror of the mind, yet identical with the object. How superior this is to allegory, which may, indeed, be ingenious, even witty, but is almost always rhetorical and conventional, and is always better the nearer it comes to being what we call a symbol."[1] "Everything can be understood only symbolically; there is always something more behind it."[2] "All our knowledge is symbolic. One thing is a symbol of another. The magnetic phenomenon is the symbol of the electrical; it is both, itself and a symbol of the other, just as colours are symbols, through their polarity, of the poles of electricity and of the magnet. So science has an artificial life, and is an extraordinary mixture of fact, symbol, and analogy."[3] Thus, paradoxically, fact and symbol coincide, yet do not coincide. It is in this sense that the Ur-phenomenon is an appearance in which the One-in-Itself appears, symbolically and actually.

(5) But there is also a subjective moment in the Ur-phenomenon, a specific attitude to reality. "What we call inventing or discovering in a higher sense is an important expression of an original feeling for truth, that has been developing for a long time in the depths, and issues as quick as lightning and unexpectedly in a fruitful discovery. It is a revelation, developing from within, that gives man a presentiment of his kinship with the Divine." This is precisely a definition of the Ur-phenomenon in its subjective aspect.

(6) Whilst the Ur-phenomenon embraces both the appearance and the thing that appears, it also includes the law of the appearance of that which was before invisible. Compare, *e.g.*, the statement: "What comes to appearance must divide in order to appear."

(7) Finally, the Ur-phenomena are also the laws of the appearances themselves. "What we become acquainted with in experience are for the most part instances which, upon a little examination, can be brought under general empirical canons. These may, in their turn, be subsumed under scientific headings, which have again a higher reference, by which we get a further insight into certain indispensable conditions of a thing's appearing. After that everything adapts itself by and by to higher rules and laws, which, however, are not revealed to the understanding by words and hypotheses, but likewise to intuition by phenomena. We call these Ur-phenomena, because nothing in the realm of appearance lies above them, yet they are of such a nature that we can descend from them, step by

[1] *Philostrats Gemälde*, 1818. W.A. I, Vol. 49, p. 142.
[2] Letter to Chancellor von Müller, November 21, 1821.
[3] Letter to Riemer, November 21, 1805.

step, as we had previously ascended, until we reach the commonest data of every-day experience."

This plurality of meanings of the Ur-phenomenon makes its relation to the Idea very difficult to determine. That the two are not identical is evident from the fact that there are a number of Ur-phenomena but only one Idea. Why only one Idea? Because there are no things-in-themselves, but only the One-in-Itself. It is possible for Goethe to conceive the Idea as one, because he has the inestimable privilege to find the true, the beautiful, the good, and the Holy coincident, their domains being all subject to the same formal principle, their spheres concentric. The one Idea means nothing else than the unity of this formal principle. To ask what more it is is meaningless. There is no answer to this. If, however, everything, which we perceive, is a manifestation of the Idea, all perishable things are reduced to symbols. In this sphere of perishable beings the Ur-phenomena represent the eternal, revealing the inner relations of nature, of man, and of God. "The understanding cannot reach to this height; a man must be able to rise to the highest plane of reason in order to touch the Divine, which reveals Itself in Ur-phenomena, physical and moral, behind which it dwells, and which proceed from It."[1]

But it is also true that, in another sense, the Ur-phenomenon is the Idea. It is the Idea immanent and active in the appearance, the creative central point, in which man, nature, and God are united. In it as a perceived order we become aware of the internal relationship of phenomena to each other, to the creative mind of man, and to God. With this Ur-phenomenon, as the ultimate object of knowledge, Goethe's inquiry after truth is satisfied.

We have seen that his method is genuinely phenomenological. It begins with phenomena, proceeds through them, and ends with them, returning at the last from the Ur-phenomena to the particulars whose claims have not at any point been abrogated. This method is a personal achievement in the double sense that it issues from Goethe's own personality,[2] and that it reacts upon it in a manner that it would need a separate inquiry to demonstrate.[3]

[1] To Eckermann, February 13, 1829.

[2] "Appearances are not independent of the observer; they are all interwoven and entangled in his individuality" (*Maximen und Reflexionen*, 1224, published by Hecker).

[3] "To grasp the phenomena, to fix them to experiments, to arrange the experiences and know the possible modes of representation of them—the first as attentively, the second as accurately, the third as exhaustively as possible, and the last with sufficient many-sidedness—demands a moulding of a man's poor Ego, a transformation so great that I never should have believed it possible" (*Correspondence between Goethe and F. H. Jacobi*, 1846, p. 198).

Although the present school of phenomenologists may have opened our eyes for the first time to Goethe's phenomenology, we must not overlook the fact that it differs fundamentally from Husserl's doctrine upon the following points:

(1) It is not, like Husserl's, a purely philosophical method, aiming at the discovery of ultimate truth, but operates at the level of science, or, more accurately, on a level between that of science and philosophy.

(2) It does not begin, therefore, with a "transcendental reduction," *i.e.* it does not annihilate the world, nor bracket it and its assumptions, nor does it desert the sphere of concrete consciousness in order to construct its system upon this plane. It is neither critical nor sceptical, but accepts phenomena naïvely, at their face value.

(3) Nor does it perform any "eidetic reduction," proceeding from that which is directly perceived to its essence. It does not ask what is the essence of colour, the essence of red, etc. It even denies that such questions have any meaning. (Goethe considers it nonsense to talk of the "essence of light.") Nevertheless it is true, as we have seen, that it reaches essences by its own route, but this route lies, or *should* from its natural tendency lie, in the realm of the phenomenal itself.

(4) Contrasted with Husserl's, this route is the route of the scientific investigator, who uncompromisingly rejects Husserl's transition from the particular to the universal, insisting upon experiment as the medium through which the subjective must attain objectivity.

(5) The law that is reached by this method is regarded, at least in its earlier stages, as hypothetical; it is not, as with Husserl, an absolute norm to which all subsequent experience must conform.

(6) As against this, the principles finally attained are regarded as having metaphysical validity, since in them the Godhead is revealed, whereas Husserl claims no ontological significance for his principles.

(7) Husserl's principles are formal; Goethe's have reference to content, and can never be completely resolved into relations of pure form.

Apart from these important differences, and from the fact that Husserl's phenomenology is a search for absolute truths and for *a mathesis universalis* encompassing the entire realm of the possible, whereas Goethe's is an investigation of the phenomenally given world, in its multiplicity and its unity, the two methods exhibit a certain community of character. For it is the endeavour of both to preserve the qualitative aspect of things from dissolution into the quantitative, and to discover its specific character.

To make clear the relation of Goethe's phenomenology to the Hegelian, and its divergence also from this, would demand an

analysis of his phenomenology of nature which must be reserved for a later inquiry.

Goethe's method has clearly certain material defects that we have no wish to conceal. It does not reach the level of precise concepts. Yet all knowledge is a knowledge of concepts. If it is his view that the system of laws underlying appearances can be immediately perceived, this is interesting as implying the denial of an abstract order of thought and hinting at a structural (*gestalthaft*) order. If, however, this leads him to regard ontological connexions as objects of direct intuition or of "intuitive judgment" (*anschauliche Urteilskraft*), whereas they are actually objects of understanding, which follows only the path of perception, he is unwarrantably restricting their range. It is never possible to decide from intuition whether an ontological connexion exists or not; and what he designates an *Ur-phenomenon* on the ground of direct perception is often extremely arbitrary. Thus the fascinating concept of the Ur-phenomenon, with the diverse meanings that we have enumerated, actually does more to conceal the real problems at issue than to solve them. It involves the problem of a structural order immanent in the phenomena, which cannot be apprehended by the processes of the old logic, but which plays an important rôle in the domain of living things—a problem that has lately become crucial through the influence of Wertheimer's *Gestalttheorie*. It also raises the problem of an order of content, *i.e.* the question as to the existence of uniform connexions that are not of a formal nature, or orders of co-existence, concomitance, the conjunction of qualitative elements, constituting peculiar structure of their own. Lastly, there lurks behind it the question of the laws which everything that is to appear must obey. If all these questions are carefully distinguished, the apparently purely perceptual character of the Ur-phenomenon vanishes.

Nevertheless, I believe that Goethe's phenomenology—as an example of a pre-philosophical phenomenological analysis—may have some real value for the present situation, for an age whose watchword is "the return to the concrete," for the transition from Husserl's abstract phenomenology to the concrete phenomenology which will be needed to prepare the ground for the reformation of the philosophical problems. Heidegger tried to effect this transition, but has unjustifiably and arbitrarily restricted its domain, leading into a *cul de sac*, so that the endeavour ought to be made once more on a wider and firmer ground. In any case, our age would do well to adopt the attitude which leads to this method: "We have daily cause to clarify our experience and to purge our minds."

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THE BASIS OF SOCIETY

ARNOLD H. KAMIAT

A SERIOUS error that has crept into the thought expended on social problems must be treated here. It consists of a false and misleading equation of problems and their solutions. Put in other words, the error consists in a failure to conceive a problem in terms of the greater whole of which it is a part, and to perceive that an adequate solution of the problem is unattainable without a correlated treatment of the larger problem. In fine, the complete solution of a social problem involves the transfiguration of society and of its component parts. How does the error in question manifest itself?

When it is a question of the solution of an economic problem, a remedy, couched in economic terms, is suggested. If it is a political problem that it is desired to settle, solutions in terms of political transformation are broached. For the marital question, a sociological prescription is offered. If it is the question of international relations that is the object of attention, the suggested answer will make its appeal to international law, diplomacy, ethnology, and political science. Biological problems call forth a eugenic programme, problems of crime a criminological and penological prescription. For the solution of the problems connected with law and its execution, jurisprudence is appealed to. In fine, social problems are treated as independent wholes bearing no necessary relation to each other. The problems are simply collocated, and to each problem there is equated a solution, the latter generally couched in terms of the art or science within the province of which the related problem is held to lie. All of which is justifiable, but only when it is used in connection with another and more important method.

The error that has just been mentioned consists of the utter neglect of the latter. The method in question is the conception of the unity of all social problems and of the consequent necessity of their joint solution by means of a gradual and fundamental transfiguration of society and its integrant parts—individuals, societies, and institutions. Society is one. Its problems are one. No one of these problems can be adequately treated except in so far as the society and the general social disharmony of which the problem is a segment are attended to. The solution of the social problem is one.

A survey of social situations and their interconnections is suggestive. Take the problem of war. To abolish war, recourse is being

had to the League of Nations, international courts, the Kellogg Pact, and limitation and disarmament conferences. But can war be abolished unless measures are taken toward the solution of the problem of population, the diminution or elimination of economic rivalry, the education of future generations in international-mindedness, the conquest of the autocratically conditioned dominance motive, the growth among humans of rational self-control, the submergence of their impulse toward cruelty, and their evolution from a competitive and feudal level of life to one more democratic?

Can the economic problem be solved by primarily economic means? Socialists, syndicalists, single taxers, anarchists, and communists think so. But what if it is found that the economic problem is correlated with every other, and requires for its adequate solution the synchronous treatment of political, marital, juridical, ethnological, biological, psychological, educational, endocrinological, and other problems? Can these co-ordinate problems be adequately dealt with by a socialist or single tax government, a syndicalist union of all the workers, or a soviet of workers and peasants? Or do all social problems constitute an integrated situation that only a synoptic vision, a comprehensive social science, and a genuine radicalism, as distinguished from the pseudo-radicalisms just mentioned, can hope to master?

The need for a sociological monism has long ago received recognition. And in response thereto false monisms have reared their heads. Foremost among these is that which derives all problems from the economic one. The solution of all social problems is contingent upon the solution of the economic one. So runs the pseudo-monism of the socialist, syndicalist, anarchist, and communist movements. The splendour and the thoroughness with which "radicals" have thought things over is revealed by the contradiction between their theory and their practice. In practice, the solution of all problems, including the economic, is made contingent upon the solution of educational and political ones. Before the economic transformation that the "radical" contemplates can begin to take place, a deal of propaganda must be undertaken, a great number of converts must be made, a social movement must be made to get under way, a party or industrial union must be organized, a class war must be waged, and political power must be won. Perhaps it may also be necessary to establish a dictatorship, suppress all freedom of thought, disfranchise a good proportion of the electorate, and roll back a few counter-revolutionary movements. The anarchist revolution will require, among other things, the destruction of the state and the organization of voluntary associations of all sorts. It is obvious then that the economic transformation of society, as

"radicals" conceive it, is not by any means a first step. It is a stage in a process, the beginnings of which involve operations of a non-economic nature. De Man has pointed out that the effectual organization of a labour union requires the preliminary moral transformation of the worker. He remarks that ethical, and not merely economic motives, lie at the basis of trade unionism. Decades ago Ely noted the self-sacrifice of myriads of socialists who gave of their own to the movement without any thought of any economic advantages accruing to them. Their thought was solely the welfare of future generations. Kropotkin conceived the social problem as basically economic, and it was to an economic mutation of society that he looked for its solution. But his scheme of voluntary economic associations presupposed an extant moral exaltation pervasive among the masses.

All the economic schemes of the socialists, the syndicalists, the communists, and the anarchists presuppose, by implication, the attainment, present or imminent, of a certain moral development. Mazzini's thought was clearer than that of the economic "revolutionists." He definitely formulated the need for an ethical transmutation, and he deemed it of sufficient importance to warrant its becoming a consciously entertained goal.

Then there is the biological monism. Social woes are referred to the operation of dysgenic factors. Social problems owe their being to the presence in society of men and women of congenitally deficient physical, mental, and moral capacities. There are too many plebeians, too few patricians, too many proletarians, not enough aristocrats. The most fundamental and the most necessary socially reconstructive measure is the adoption of a eugenic programme.

Such a programme is undoubtedly needful. But it is a programme that can be adopted only to the extent that other and non-biological reconstructions and reforms are effected. The solution of the biological problem must parallel and be paralleled by the conquest of other and non-biological problems. The eugenic programme requires for its successful consummation electorates and legislative bodies more intelligent and more scientifically minded than those now extant; it requires a wider dissemination of prevenceptive knowledge, and this in turn requires the conquest of prudery and the modification of the laws that govern obscenity, so-called; further, in order that there come into being a more intelligent electorate, the economic problem must be solved to an extent permissive of such higher standards of life and such an augmentation of leisure as will make possible a wider diffusion of culture than now exists. And further, the success of a eugenic programme will require the abandonment of the traditional valuation of population-quantity over population-quality. In fine, the solution of the biological

problem requires the parallel conquest of certain non-biological ones.

How shall a genuine sociological monism be arrived at? Perhaps this question is more easily answered after a close examination of the fallacy of the false monisms of the sort that have just been treated.

The fallacy lies in this, that it is sought to explain a multiplicity of objects in terms of one class of them. Or to put it differently, it is sought to explain several categories of social phenomena in terms of one of these categories. This represents an attempt to interpret a whole in terms of a part, conceived not as a part, but a cause of the whole!

Still another error lurks in the process. This error consists of the confusion of causality with coeval correlationships. The segmental monist simply mistakes a correlation of two or more social processes for a causal relationship. It is assumed that if all non-economic social phenomena can be shown to be correlated with economic processes, then the economic causality of social changes is demonstrated. Or if all non-biological processes can be revealed as correlated with biological phenomena, then the primacy of the biological is established.

The error of segmental monism is really an error in metaphysical thought. Although the self-styled practical person—and almost everyone who is not by profession an artist, or scientist, or philosopher styles himself practical—affects a disdain for metaphysics, he nevertheless delves into metaphysical speculations and employs metaphysical presuppositions. He does this unwittingly, of course, but he does it.

The metaphysical error to which attention is being drawn here has to do with the conception of society as of something that rests upon something else as a basis. Speculation then endeavours to ascertain what these bases might be. There is no need to dwell on them here. Everyone is familiar with them. Everyone has repeatedly received the assurance that the basis of society is the industrial order, the political system, the human germ-plasm, the family, the mores, the church, the ideologies, the division into nations, the gregarious impulse, or the legal structure. Every single one of these claims is misleading.

What is meant by the term "basis"? From a relative standpoint, anything that functions as ground. But this is not the sense in which the sociological monists employ the term. From a relative standpoint, everything may serve as a basis with reference to something. But the sociological monist who assumes that the transformation of a given aspect, and of that given aspect only, of the social order

involves a radical transfiguration of that order, is unquestionably employing the term "basis" in an ultimate sense. Before entering upon the exposition of the metaphysical falsehood peddled by the sociological pseudo-monist, care should be taken to distinguish him from the genuine sociological monist, who correctly asserts that the modification of *any* important aspect of the social order involves the metamorphosis of that order. Why the one speaks truly and the other misleads will soon become apparent.

What can the word "basis" mean in the ultimate sense? Only one thing: that which is a ground, but has itself no ground. It is that on which everything rests, while it rests on nothing. Everything is dependent upon it; it is dependent upon nothing. Such is the basic defined in the ultimate sense. It is now in order to assert that a sociological monism that converts any aspect of the social order into an ultimate basis of society is misleading, and, further, that society cannot properly be spoken of as possessed of any basis other than that constituted by the very essence of society itself. That is to say, society has no basis other than that which is numerically identical with the essence of society itself. The essence of society, that which makes society society, is its basis.

Enough has already been said to dispose of the economic and biological monisms. Neither the economic nor the biological can be classified as basic, for neither can be said to be independent and to rest on nothing beyond itself. Each is dependent for sustenance on a great many other aspects of the social order. It has been seen that the practices of the radicals refute their theory of the basic economic. And a similar thing may be asserted of the eugenists, the believers in the basic biological. They are compelled to rely on all the aforementioned non-biological factors for the institution of their eugenic programmes. Sir Francis Galton is even reported to have said that the adequate execution of the eugenic programme would require the distribution among men and women of a kind of religious zeal for biological improvement. But a religious zeal for anything is not a biological phenomenon, at least not in the sense contemplated by the eugenist.

That which has been said concerning the economic and the biological can be asserted with reference to the political, the juridical, the cultural, the moral, the religious, and any other segment of the social order that may be classed as basic.

The word "basis" should be used with full regard for its meaning, or it should not be used at all. Those who cannot accept its meaning, its implication, should drop the use of it. It is a metaphysical concept —and the problem of the basis of society is a metaphysical problem. This will scare those whose delicate mental constitution unfits them for a metaphysical fare, and those who may be described as meta-

physic-phobes, persons who are rather squeamish about metaphysics and shy away from every manifestation of it, their peace of mind being dependent on their failure to detect the metaphysic latent in every one of their own views on things. These people must either overcome their squeamishness or keep quiet about almost all the questions that matter, that concerning the basis of society included.

The definition of the basis of society is to be arrived at by two stages. The first stage requires that society be envisaged as a whole, a unit, an integral. Such a step enables one to transcend segmental viewpoints, and all the nonsense connected therewith. Practically all the discussion concerning the basis of society is vitiated by the segmental method employed. An aspect of society is abstracted from it, placed under society, and termed a basis. This process serves to blind one to the fact that the basis, so-called, being but an aspect and not the foundation of society, and therefore dependent for its proper function on all the other aspects, is not a basis within the proper meaning of the term. But surmount the segmental viewpoints, and a view of society as an integrated order, an organized essence appears. Herein lies the basis of society: in its unity, its wholeness, its self-consistency. Society is an entity, containing parts, bearing certain relations to one another. Every part and every relation has its setting within this whole—it rests therein, has its roots therein. It has its widest social meanings determined by and within the whole.

The second stage in the process requires another ascent. This time society and its unity must themselves be surmounted. (What comes now they whose attitude toward the metaphysical partakes of so much squeamishness will find quite unpalatable.) The integrity of society must be perceived in its wider context. It must be perceived as the expression of a bond that is more fundamental, nay, most fundamental—the expression of that which is really and truly basis —itself without ground, yet the ground of all else. To such a step all that has just been said concerning the basis of society logically commits us. If integrity is basis, and the wider integration is fundamental with reference to included and lesser integrations, then the social order must itself rest on a larger order, and ultimately on the largest order conceivable. This is equivalent to the statement that it rests finally on the ultimate principle of order, whatsoever it might be. And it is there that the most ultimate basis of society is to be found. Further, it is in terms of this ultimate integrative principle that all problems of social construction and reconstruction are to be approached. This means an end to the business of wrenching something out of the social context, placing it beneath the social structure, and terming it a basis. It means an end to the destruc-

tively harmful fallacy that social progress must halt at all points but one, misconceived as fundamental, and mark time while progress at that point is completed. It means a conception of progress as distributed, simultaneous, carried on with a due regard for the balance and the rhythm and the order of the whole.

PHILOSOPHICAL SURVEY

PHILOSOPHY IN FRANCE

M. LE ROY'S INTERPRETATION OF EVOLUTION

No trait is more characteristic of contemporary philosophy in France than its continued fecundation by the physical and biological sciences. The divorce between philosophy and science that existed in the first half of last century is now regarded, by almost common consent, as an error of the great pre-war Unenlightenment. The *ménage* is *rémonté*; the *vieilles traditions* of Descartes and Pascal live again, though very transfigured. How long the alliance may endure, how and how much it may benefit both parties, it would be idle to prophesy. But it is significant that Boutroux and Bergson were compelled to devote much energy to acquiring a scientific competence, the one in mechanics, the other in biology. It is still more significant that a number of professional scientists (such as Milhaud, Duhem, Hannequin, Paul Tannery, Poincaré, and Meyerson) should, with the passing of years, have contributed less to their sciences and increasingly to philosophy. This mutual invasion of territories has, indeed, become so considerable and enduring that philosophy in France is at present, for good or ill, almost wholly 'philosophy of the sciences.' It is now within this 'internationalized' neutral zone that the distinction between the epistemological and the ontological has to be drawn. Thus, Meyerson fairly represents the former emphasis, Bergson and Le Roy the latter. And if it is rare for one man to hold successively a chair in mathematics and a chair in philosophy, like Milhaud and Whitehead, rarer still is it for one man to hold both concurrently. But M. Edouard Le Roy has for many years lectured on mathematics and mechanics at the Faculté des Sciences in Paris; he has extended and modified Bergsonism from Bergson's former chair at the Collège de France.

In 1899,[1] M. Le Roy made clear his essential agreement with Bergson's interpretation and evaluation of scientific knowledge, and exposed what he still considers the radical falsity of mechanism. That natural occurrences are completely determinate and that natural facts are always specific is the suppressed premise common to the views of the man of science and the man of no science. The truth is just the contrary of this, M. Le Roy maintains. If it really is Nature we are speaking of, and not an intellectualized representation of Nature, then what is natural is never specific nor ever completely determinate. The conventional character which Poincaré assigned to only the most pervasive laws of science, M. Le Roy affirms of all without exception. "It is the scientist who makes the order and determinism he supposes himself to recognize in things." Hence, since the only laws that science finds acceptable are such as are quantitatively determinate and formulated in terms of fixed concepts, it follows for M. Le Roy that scientific laws describe natural occurrence as having a character which really it has not. Likewise, the common view of natural fact—presupposing a *morcelage*, a *découpage*, in the continuity of natural process—is a conception the scientist constructs by the aid of

[1] Cf. "Science et Philosophie," *Revue de Métaphysique et de Morale*, 1899.

spatial imagery, and devoid of ontological justification. The very procedure of the sciences declares the relativism that unavoidably infects their results. It is a procedure of unverified and unjustified elaboration. What is initially called "data" is not that which is given, but something much more manageable that is conceptually created and substituted *for* what is given. Such artificially simplified "data" eventually become displaced by laws, and these remove us farther from the Nature we are supposed to understand through them than do the "data." Ultimately this intellectualist elaboration culminates in the notion of a rational science which, however 'economical' and useful, lacks the ontological justification essential for its acceptance as genuine knowledge. 'Rational science' is but "the outermost term" of intellectualist construction, "no more than a purely formal play on symbols (*jeu d'écriture*) without intrinsic significance." Nor may we speak in strictness of applications verifying our hypotheses: it is rather that the hypotheses are so constructed as to show the success of our applications. Like our calculations, they are not true in a strict sense of the word, though they are efficacious. Their success, however, is "less the issue of our knowledge than of our action." Scientific laws on this view are simply "recipes" enabling us to intervene successfully in nature and compel its forces to subserve our ends in practice and industry. "Scientific determinism is not strictly a reality we discover, but a decree we impose." Thus, far from denying freedom to our will, science itself postulates it."[1] And the conclusion that all discursive knowledge is vitiated by an inescapable relativism carries with it a restricted form of pragmatism. The primacy of action and the volitional freedom presupposed by science is manifested at three levels: in practical activity, discursive activity, and intuition. To the two last we shall return later.

It is from these preponderatingly negative results that M. Le Roy began a series of researches into biological and human evolution, and their outcome is represented in the five volumes[2] which present a constructive idealist philosophy. *The Idealist Exaction and the Fact of Evolution* forms the first link in the chain. And by "Idealism" he understands two connected philosophical tendencies, the one reducing all existence to thought, the other subordinating all existence to whatever dominates and governs thought. "Thought," however, must be understood not as exclusively judgment and ratiocination, but with the wider Cartesian connotation of any species of mental operation. And to this is assigned, by way of comprehension, the Bergsonian character of an activity possessing no "immutable nature" but continuously exploratory and at times creative and inventive.

Now when we consider the character of the findings in palaeontology and evolutionary biology, it would seem at first blush as though the twofold exaction of idealism just cannot be met. For these scientific results are regularly represented as presupposing the primordial existence of inanimate matter. Consciousness has accordingly to be introduced as a sort of later addition *plaquée* on matter, or as a residual by-product. "The history of the cosmic phenomenon appears as a real enigma, something paradoxical and almost scandalous in the idealist perspective, for it seems to force our acceptance of first origins that are wholly material." But, M. Le Roy is convinced, there is no genuine problem here to be faced. It is our assumption

[1] Cf. art. *Bib. du Congrès de Philosophie*, 1900.

[2] Edouard Le Roy: *Les Origines Humaines de l'Evolution et l'Evolution de l'Intelligence* (pp. 375; Fr. 20); *L'Exigence Idéaliste et le Fait de l'Evolution* (pp. 270; Fr. 15); *La Pensée intuitive, I. Au delà du Discours* (pp. 204; Fr. 15); *La Pensée intuitive, II. Invention et Vérification* (pp. 296; Fr. 20)—all published in the collection, "Bibliothèque de la Revue des Cours et Conférences" (Paris: Bovin); and *Le Problème de Dieu* (pp. 250. 1929. Paris: L'Artisan du Livre. Fr. 20).

of the ultimacy and disparity of matter and mind that creates our "problem." What the findings of palaeontology and biology really indicate is no more than a bifurcation of the mental within the vital. So the genuine distinction lies between life and mind, not between matter and mind. All of which evidently amounts to saying that the demand idealism makes upon M. Le Roy is that he should exhibit biological evolution as freed from "the sterilities and contradictions of materialism" and as expressing no opposition to the primacy of consciousness and value.

His earlier critique of scientific naturalism had, of course, cleared the way for a non-mechanistic treatment of the appearance and persistence of life on earth. The philosophical interpretation of biological evolution divides at this point, involving two distinct projects, *viz.* (i) a re-interpretation of matter on the analogy of habit which is "pre-individual and trans-individual" (matter being defined in consequence as "a constellation of habits sunk into oblivion," or "dead habits"); and (ii) an examination of the inventive character present in creative activity. That life could emerge from matter is ruled out by the fact that change in matter proceeds from higher to lower 'potentials' (testified by the far more frequent occurrence of chemical destruction than chemical synthesis in inorganic nature). But vital change proceeds in the reverse direction, from lower to higher potentials. That human beings can make chemical compounds more complex than those offered by nature is indirect evidence. A mechanistic type of theory explains best lower manifestations of life, a vitalistic one the higher developments. But neither nor both can explain the occurrence of genuinely new forms of life. Evolutionary theories which assign the dominant rôle to adaptation are doubtless sufficient to explain those stoppages in life-process at which this or that distinctive form of life is first manifest. But they are not sufficient also to explain the organization which carries that process to higher and higher manifestations. On the other hand, M. Le Roy finds nothing in the various evolutionary theories he examines (chs. ii–iv) which excludes the possibility of a conciliation between a psychological interpretation of life and "the most radical ambitions of physical chemistry." Vitalism usefully stresses the "trans-mechanical" character of life, but the origination of new forms becomes intelligible only by a doctrine (M. Le Roy's "neo-vitalism") which, while leaving a free hand to physico-chemical principles, makes it possible to understand how organisms can build themselves up and repair themselves. Life makes its own demands and has its own distinctive and original tendencies.

What the direction and character of evolutionary process fully is, and why it should be just so, is not to be made intelligible by interrogation of its biological manifestations. It is to the more developed stage of creativity, expressed in human thought and industry, *i.e.*, to the work on *Human Origins and the Evolution of Intelligence*, that we must turn. What exists manifests new and higher levels of creativity. But creation and evolution are not incompatible nor mutually limitative. On the contrary, they are mutually explicative. In tracing back the evolution of natural phenomena, science can find no absolute beginning. Its procedure of "parcelling" leaves it always confronted with an inexhaustible residuum, never with a single, initial, instantaneous and completely accomplished event. Nor does evolution require such an event. It exacts only a continuous passage—a process which "traverses and fills the universal duration, manifested in all the variety of one immense continuity." There is no making of 'things' one by one to be accounted for, as common speech seems to suggest. The duration and creativity of evolution are alike exemplified by the recurrence of new forms and new types of behaviour. And it is in terms of these that M. Le Roy provisionally defines

'invention' as being a generative passage "from an inferior to a superior level by means of an act issuing from the former." It remains therefore to elicit the various modes of inventive action displayed in the continuum of vital process. Although invention occurs at pre-human levels, it can be understood only by considering its manifestations at the human stage.

It is an arresting fact that man's rôle in the universe is altogether disproportionate to the morphologically slight difference of his body from that of non-human animals. His domination is unforeseeable and undeducible from an inferior level. Man's conquest of the earth, his subjugation of other species to serve his ends, his adaptation and habituation of the members of his own body to serve as his instruments, and—even more remarkable and impossible to non-human animals—his use of the members of his own body to invent instruments external to the members that use them (*sans s'y incarner*), so escaping domination by his own body in that he can act in ever new ways without having to modify his body to do so—all such inventive and purposive creation distinguishes the human group. But most profoundly is the "Noosphere" differentiated from the enveloping "Biosphere" by the emergence of self-awareness and reflective activity in man. In its occurrence and employment the inventive character of the "hominizing" process becomes most plain. Renouncing his arboreal life, man becomes a two-legged walker and a two-handed worker. He can use his hands for other ends than walking. He is intelligent because he possesses hands, he possesses hands because he is intelligent. "Hominization" advances with the purposive use of fire and the shaping of stones. His purposes are at once individual and social, and with the need for collaboration he invents its instruments—language and custom. And with the development of social existence and purposes, greater becomes the liberation and variation of conscious expression. For the same reason that M. Le Roy found the question, 'How can vital activity be explained as emergent from matter wholly non-vital?' was one that should not be put, so here there is no genuine problem of how the 'hominizing' and conscious character of human activity can be derived from non-conscious vital action. In the inventive process of nature there is no bifurcation of the sort suggested, therefore none to explain. The process is initially at once conscious and inventive, as it is at once evolutionary and durational. Its creativity is comprehensible only through its inventive (*i.e.*, spiritual) character, and this is seen to remain, M. Le Roy holds, so soon as we make the due mental correction of eliminating the static-mechanistic conception of inorganic matter from biology. "La vie est conscience dès l'origine, conscience diffuse qui peu à peu se concentre, s'intensifie; et toute conscience enveloppe un germe de refléxion naissante: elle ressemble à une refléxion qui reste virtuelle, parce qu'elle s'oublie et se perde à mesure qu'elle s'éveille. On n'a donc point à expliquer un commencement absolu de la puissance refléxive: tout revient seulement à voir comment elle se dégage et se fixe."

The varieties of activities manifest in the successive stages of the 'hominizing' process reduce to two types, the technological and the purely reflective. The development throughout shows no steady and constant advance or uniformity, but discontinuity, oscillations, 'leaps', crises and periods of comparative stagnation. In this respect, intellectual evolution conforms to the pattern of vital evolution, for evolutionary process is all of a piece. There is no 'rhythm of progress' to be discovered, for the good reason that this would imply the operation of some form of necessity and so rob creativity of its essential spontaneity and novelty. And we to-day, M. Le Roy suggests in his penultimate chapter, are passing through one of those "crises" or mutations in the process of hominization. "C'est le drame de la moralité qui commence," to

be traced to (i) a technical advance that has been too intense and rapid ("le tourbillon des gestes ne laisse plus le temps ou la force de la refléxion morale"); (ii) the old social framework being broken and not replaced; (iii) the loss of our old cosmological framework, and our consequent uneasiness concerning the worth of spiritual beliefs and their admissibility within a 'system of nature' that has grown so immoderately. In these diverse social disturbances we are witnessing the "premiers tressaillements annonciateurs d'une suprême phase de genèse vitale: la réalisation de *l'homo spiritualis*."

Such is but the barest skeleton of M. Le Roy's philosophy. A suggestive indication of the vast mass of scientific material he adduces and dissects so expertly is impossible within the limits of my space. Nor, indeed, is even the outline fully drawn; but I hope to complete it with an account of M. Le Roy's most recent works—*Intuitive Thought* and *The Problem of God*—in the July number of this Journal.

S. V. KEELING.

PHILOSOPHY IN GERMANY

IN the *Critique of So-called Practical Knowledge*[1] ALF ROSS wishes to show that ethical judgments are nonsensical. He begins by asserting that when people speak about practical knowledge they mean knowledge which contains an unconditional command to the will, and this, he points out, involves a confusion between knowledge and volition. Thus, since all ethical theories are forms of practical knowledge, they are doomed to failure. All ethical theories can be classified into two types: they all belong to the ethics of value or the ethics of duty. These differ very radically, since the one takes value and the other duty as its fundamental concept; but they are inadequate for the same reasons. Both value and duty are self-contradictory concepts, and both awareness of value and awareness of duty are quite different from what ethical theories suppose.

Ross supports these charges with a great deal of detailed discussion, and in a brief account one can only indicate his arguments very roughly. Thus, for example, he supports his first charge by concluding that value is an unanalysable quality and yet also contains a relation to the will. On the one hand, all naturalistic analyses are inadequate, and yet, on the other hand, if value is an unanalysable quality, our knowledge of it can only be theoretic, and so will not be practical knowledge. He supports his other charge by analysing awareness of value and awareness of duty in great detail. All disinterested behaviour, he believes, is dependent on impulses excited by suggestion. As behaviour series frequently recur we associate our impulses with certain objects, and when we experience the impulse we think of the object. Ethical theories mistakenly suppose that impulses (pleasures and desires) refer to objects in some other way.

Ross concludes that ethics should be replaced by ethology. Moral judgments are nonsensical, but moral phenomena are real. They are conative experiences dependent on suggestion and leading to behaviour. Ethology is the psychophysical study of this behaviour.

The major part of the book consists of a detailed examination of different ethical theories. And though the author's main aim is to prove that they suffer from the defects indicated, he is very willing to acknowledge that they often exhibit a great deal of insight.

[1] *Kritik der sogenannten praktischen Erkenntius.* Felix Meiner. Leipzig. 1933. Pp. 456.

In *Our Dissatisfaction with Civilization*[1] SIGMUND FREUD maintains that the main reason why civilization dissatisfies is because it thwarts the aggressive instinct. This view, he remarks, may appear to indicate a fundamental change in psycho-analytic theory, but in fact is a development of long-accepted views.

It is obvious, he says, that many people are dissatisfied with civilization, and some believe that we would be happier if we returned to more primitive conditions. What can we say to this view? It is futile to attempt a comparison between the happiness of one epoch and another. The better method is to discover the extent to which civilization satisfies and thwarts our instincts. We can assume that its origin and development are due to its satisfying fundamental desires. It has enabled men to satisfy their material wants. It has guaranteed a permanent object of love for man and woman, for man in his wife and for woman in her child. However, it is obvious that it also thwarts the sexual instinct, but it compensates to some extent by the sublimations of this instinct which make scientific and artistic achievements possible. Its most formidable enemy is the aggressive instinct which perpetually conflicts with its attempts to bind men together into wider unities.

How, then, does civilization defend itself against man's natural aggressiveness? It has three methods of defence. We find that the members of one social group direct their aggressiveness on to the members of another group, so that, for example, neighbouring states are often hostile to one another. Secondly, civilization relies to a certain extent on love in its modified form of friendship. But this defence is very inadequate. The law, "Love thy neighbour as thyself," conflicts so sharply with the aggressive instinct that it can only be enforced at enormous expense. We pay for civilization by transforming our aggressiveness into the feeling of guilt.

Freud then discusses the origins of this feeling. Perhaps the two most important points are these: (1) That the super-ego and conscience, its function, originate through love and hate of the same object. The hate leads to hostility (in deed or thought) and the love to remorse and formation of the super-ego. (2) That thwarted aggressiveness is turned inwards and transformed into the super-ego, so that the super-ego increases in severity the more we thwart our aggressiveness. Thus civilization which perpetually thwarts aggressiveness increases the feeling of guilt to an enormous extent. And we must ask whether this burden is bearable or not. For just as the individual conscience sometimes makes unreasonable demands, so it is with the social conscience, namely, morality. The fate of civilization, so Freud concludes, depends on its ability to deal with aggressiveness.

The Problem of Genius,[2] by W. LANGE-EICHBAUM, gives a short and concise account of conclusions which the author has discussed at greater length in an earlier book.[3] They are based on empirical investigation into the circumstances and character of people taken to be geniuses. It is obvious, as the author points out, that judgments concerning genius vary very much in the sense that a man is idolized at one time or place and reviled at another. It is also clear to the unbiassed observer that some of the men acclaimed as geniuses have little ability of any kind. We shall understand this state of affairs if we realize that in judging someone to be a genius we are not talking about a specific capacity or objective characteristic, but indicating that he satisfies certain needs. Thus, in investigating the problem of genius we must consider what these needs are, and by what means they are satisfied.

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[1] *Das Unbehagen in der Kultur*. Internationaler Psychoanalytischer Verlag. Vienna. 1931. Pp. 136.
[2] *Das Genie-Problem*. Verlag Ernst Reinhardt. Munich. 1931. Pp. 127.
[3] *Genie-Irrsinn und Ruhm*. Verlag Ernst Reinhardt. Pp. 500.

A man is called a genius when he produces a certain very complex state of mind in his admirers. He must impress them by some achievement, overwhelm them by his energy, conciliate them by his charm, astonish them by something strange, and awe them by something terrible. He will then satisfy their desire for something mysterious and exciting, for something to worship. By what means does a man create this complex impression? Lange-Eichbaum points out that he must be famous, and considers the factors on which fame depends. It is also clear that exceptional ability is a favourable factor, but we must note two points. In the first place, many men of the highest ability have never been considered geniuses, and this is because their achievements have been too rational and unemotional. An artist, for example, is more likely to be considered a genius than a scientist. And in the second place, men without special ability of any kind have been called geniuses. It is true that they have always been accredited with some achievement, but the achievement may in fact have been due to chance or to the co-operation of many factors.

Abnormality is another favourable factor. Lange-Eichbaum maintains that the majority of geniuses have been pathological, while some have been psychotic, that is, definitely mad. The conjunction of abnormality and talent leads more readily to fame than talent alone. An abnormal man feels a stronger urge to express himself, his work is likely to be more emotional, and the circumstances of his life, ending perhaps in a tragic death, will excite both attention and sympathy.

H. KNIGHT.

NEW BOOKS

God and the Astronomers. By WILLIAM RALPH INGE, K.C.V.O., D.D., F.B.A. (The Warburton Lectures, 1931–1933. London: Longmans, Green & Co. 1933. Pp. xiii + 308. Price 12s. 6d.)

If Warburton Lecturers obeyed their founder to the letter they would hold forth—as Dr. Inge observes—either on Old Testament prophecy or the errors of Rome. The Dean treats of "a *prophecy* certainly, though not quite the kind of prophecy which Bishop Warburton had in his mind. It is the prophecy of modern Science about the ultimate fate of the world we live in" (pp. 1–2). This prophecy is prominent in the writings of certain astronomers who have the public ear; hence the title of this book, which "deals mainly with cosmological theory—the relations of God and the world, of time and eternity, of existence and value" (p. 213), or which seeks to "state and defend the proper attitude of a thoughtful Christian . . . towards the world of space and time, of change and flux, of birth and death" (p. 15). The Dean approaches his problems "from the standpoint of the *philosophia perennis*" (p. 120), or of the "Great Tradition"—by which is meant the confluent streams of Christian and Platonic philosophy, including Aristotelianism. The standing formula is, "The Great Tradition in Philosophy has always conceived. . . . It follows that. . . ." (p. 71). This method—which, perhaps, no writer ever quite avoids—tends to make a philosophical work persuasive only to the persuaded; but in this instance the reader, whether persuaded or not, is sure to find a great deal to approve—if it be only some of the Dean's many dislikes—which include the mentalism and indeterminism of the "astronomers," emergent evolution, vitalism, and Progress (with a capital P).

The second lecture—entitled "The New *Götterdämmerung*" (a preliminary version of which appeared in Vol. VII, No. 26, of *Philosophy*)—considers the religious and philosophical consequences of the Second Law of Thermodynamics. This law, Dr. Inge concludes, is fatal to "Modernist philosophy" (*i.e.* to any theory which truckles to time), but presents no intolerable difficulty to the Great Tradition which "postulates an eternal or changeless background, which is untouched by whatever fate may be in store for the visible universe" (p. 28, cf. pp. 69–70). But to this Dr. Inge adds the admittedly unsupported opinion that there will always be a created universe as well as "the realm of eternal and absolute values," and expresses (it is interesting to note) his personal adhesion to the ancient notion of the Great Year, or of cyclical reiteration.

Concerning the "Problem of Time" (the third lecture, but the theme is continued in those which follow on "God in History," and "The Eternal World") the Dean follows a line suggested by the above postulate. He asserts, however, that "We must be on our guard against simplifying the problem by treating either Time or Eternity as unreal" (p. 118). But since his account is even closer to that of Bradley (who is "helpful on almost all subjects") than to that of Plato, time comes off very poorly. (It may be observed, by the way, that throughout the book Dean Inge is deeply influenced by the author of *Appearance and Reality*. When he asserts, *e.g.*, that "reality is a coherent system which may be viewed indifferently from any point within it" (p. 87), we may wonder what is to become of his Theism as ostensibly distinguished

from Absolutism.) Time, he maintains, can only be called real by recourse to the doctrine of degrees of truth and reality, which is adopted as intelligible in a philosophy which identifies value and reality. Time is "real," but not "ultimately real." Since, however, the highest values—though non-temporal and non-spatial—require time (and space) "for their manifestation," is it not clear that these should be considered no less real than that which they "manifest"—as for an atomism the void must be no less real than the atoms? Dr. Inge argues for the distinction between earlier and later as more ultimate than that between past, present, and future. The former expresses, it is said, a "logical or teleological" order, rather than a temporal order. But should not the former be recommended as more adequate to the nature of time as we experience it rather than preferred as non-temporal? And what, we may ask, is "teleological" if not temporal?

Time, again, is "as real as the conflict between good and evil" (p. 91), and because of this sinister alliance with time goodness or moral value is not accepted quite as an equal member of the family of absolute values. "Neither Truth nor Beauty depends on Time to anything like the same extent" (p. 119). But if they depend upon time at all, the conclusion ought to be the same—and the Dean reminds us that a scandalous exception is not excused by being small. He realizes—for who does not?—that "without careful definition it" (the concept of value) "may easily cover up the difficulties it offers to solve" (p. 174), and that "it wants much clarification"; but the clarification, I venture to think, is not here. If, *e.g.*, these values are really just what Plato meant by his highest Forms (as he maintains), they cannot be "defined" at all, since they are that in terms of which all else is to be defined. "Value," the Dean observes, "is universal and prior to particular existence" (p. 183). Values are also said to be thoughts in God's mind, or alternatively "attributes" of God. They require, however—how or why, if attributes of God, we are not informed; unless we are to suppose that Dr. Inge travels all the way with Spinoza—"spirits" to "bear," "manifest," and "appreciate" them. One could wish that this last suggestion were carried out more rigorously, but the Dean follows Bosanquet in seeking a theory of values which does not require "persons" to appreciate or to sustain them. He considers "personality" a lower character than "individuality"; the notion of a "person" suggesting an "impervious ego" which he is anxious to escape. But this doctrine of "individuality" turns out, in the hands of its proponents, to be just the denial that there is any individual but the Absolute. Does Dr. Inge simply accept this consequence and introduce the plurality of "spirits" essential to his Christian Theism as a concession to the vulgar orthodoxy he emphatically disclaims? Furthermore, the concept of personality is surely richer than that of bare "spirit," as is borne out by the Dean on page 247, where he speaks of the "undivided personality" as the organ of our apprehension of God. He quotes Bosanquet's observation—as giving his own view—that values are "spiritual worlds, at once objective and subjective." What, if anything, can this mean?

In the concluding chapter Dr. Inge gives a suggestive résumé of the positions of "my master Plotinus," drawing for this upon his Gifford Lectures. Of sensible reality he asserts in this connection that "it is incorrect to call it reality at all." Strangely enough he appears (perhaps inadvertently) to base his confidence in the reality of values on the analogy of sense-perception. "If it be asked how we are aware of non-spatial and non-temporal value, the answer is that we perceive them and know them with as much right and certainty as we perceive and know the things of sense" (p. 123, cf. p. 208). This is upon his own principles a beggarly recommendation. Perhaps we have

here an illustration of the artificiality of all such repudiations or disparagements of sense-perception, which may not give us knowledge in the highest Platonic sense, but which lies at the root of all that we can ever claim to know. Disparagement of it can only recoil upon the head of its detractor.

Did space permit I should like to debate at length the assumption that there is a single Great Tradition, Catholic and Platonic, which effectively unifies the thought of Plato, Aristotle, Plotinus, and Saints Augustine and Thomas, Spinoza, Bradley, Bosanquet, and von Hügel. Such a procedure, it seems to me, can only eliminate or diminish significant differences where it does not encourage positive distortion. Of this last, needless to say, Dr. Inge is guiltless, but it does appear—to touch upon one instance—that he is accepting incompatible suggestions and positions from the distinguished thinkers last named. While it is certainly possible to learn from both, their antipathy goes so deep that one can only be in active sympathy with one at a time. Or again, is it not missing the force of Thomas's fundamentally realist outlook and empirical starting-point, to see in him merely a version of Platonism as viewed through the ultra-speculative eyes of the later Platonists?

From the viewpoint of Christian theology, moreover, this simple unification of the Neo-Platonic and Christian *Weltanschauungen* will not pass unchallenged. As Émile Bréhier recently pointed out, St. Augustine tried this synthesis, but very soon gave it up. M. Bréhier concludes his important study[1] as follows: "Nous avons vu les essais, toujours vain, du christianisme pour fixer un de ces moments" (Platonism, Aristotelianism, and the philosophies of the seventeenth and nineteenth centuries) "pour s'en emparer; mais on ne peut pas plus parler d'une philosophie chrétienne que d'une mathématique chrétienne ou d'une physique chrétienne." Whether or not one accepts M. Bréhier's conclusion, one may feel that in this sort of Great Tradition the specifically Christian view is bound to fare badly.

Since the Dean's interesting book is itself polemic, I have ventured, in this review, to consider briefly a few points raised by some of his central positions rather than to outline the work in greater detail. Thus much that is timely and—as goes without saying—well said in these Warburton Lectures passes without comment. It may not be unfair to the book as a whole to say that its most suggestive matter is of the nature of *obiter dicta* and occasional comment, and that it is more effective in criticism of the "astronomers" than in construction of an "axiological philosophy," for which a great deal of sober preliminary inquiry yet remains undone.

I have noted two slips only: on p. 196 n. read *Nature of,* and on p. 171, l. 5, read *grievously*.

RALPH E. STEDMAN.

The Horizon of Experience: A Study of the Modern Mind. By C. DELISLE BURNS. (London: George Allen & Unwin, Ltd. 1933. Pp. 372. Price 12s. 6d.)

It is generally recognized that we are living in a revolutionary age, not merely in the departments of industry and politics and the thought and emotions appertaining thereto, but in all the sciences and arts, in literature, personal and social ethics and religion. It is for philosophy attempting to understand, present, and interpret all aspects of experiences in their relations to one another, to give attention to this revolutionary process, and to assess

[1] "Y a-t-il une philosophie chrétienne?" in *Revue de Metaphysique et de Morale*, No. 88 1931, pp. 138–162.

its meaning and value. Philosophers of the chair are perhaps seldom well-equipped for such a task. They are apt to be too much immersed in abstract thinking, with too slender attachments either to the "common sense" which infuses the thought and feeling of ordinary men and women, or to the new achievements in the particular arts and sciences, to give philosophic attention to the process as a whole. Moreover, there is always the danger arising from intellectual vested interests, the conservative attitude of an accepted system, which tends to make the mind inhospitable to troublesome newcomers. Now Dr. Burns has the great advantage of close personal experience in many of the fields where new truths, new hypotheses, new forms of art, new social experiments are breaking in. He is thus able to bring a singularly well-informed and sympathetic mind to bear upon the explanation of the philosophic significance of this revolution in the ordering of human thought and conduct. We ordinarily think of new discoveries in the sciences and arts as adding to the existing stock of knowledge or technique. That, however, is an error, due in part to a too atomistic view of knowledge and of art in general, but largely also to an imperfect understanding of the part played by "the horizon of experience." For it is horizon facts, and the knowledge, the thoughts, and emotions, which, at first faintly envisaged, are drawn in by the urge of discovery, that are the key to the understanding of the new world, at once fascinating and perilous, in which we are living.

The greater part of Dr. Burns's work is devoted to bringing out the meaning of this generalization by illustrations from the various arts and sciences, a keen investigation of what is happening to these at the horizon. While in modern science the new facts and theories of radio-activity, relativity, and the quantum have transformed the very bases of the physical sciences, and while in the arts new forms of music, dancing, painting, sculpture, and architecture have largely displaced the older forms by the establishment of new interests or values, equally significant horizon facts are penetrating personal morality and public policy—in every line of conduct. The perils of such change are often exaggerated, because it is believed that all continuity is broken and that past standards and customary valuations are simply "scrapped." But this is a hasty and erroneous interpretation. Though there is everywhere a tendency of old-established ways and standards to become obsolete, it is not a question of wholesale clearance, or even of cutting away "dead wood." The new horizon values come in to utilize old values by a process of transmutation and invigoration which carries a true continuity within the novelty.

Dr. Burns, in a series of fascinating studies of what actually happens in the different lines of experience, presents a powerful plea for adventure. In the arts and sciences, as in industry and government, in ethics and religion, the reliance on completed systems, backed by custom and authority, can give no sense of security. Order can only be maintained by progress, that is, by the willed attainment and assimilation of horizon experience. The art of such attainment, the process of discovery, is most clearly seen in the fine arts, for there the creative activities work most freely, and Dr. Burns gives close attention to what actually takes place when a musician, a painter, or a sculptor is at work. The truth is then disclosed that he doesn't quite know what he is doing, or what he is after, until he has achieved it. This, of course, also applies to the processes of speculation and hypothesis in the sciences, the early fumbling and more or less blind "trial and error" from which experimentation and new laws emerge. But such new horizon values, at first the personal achievement of artistic or scientific genius, only attain their end in rearranging and transmuting past values of truth, beauty,

or goodness as they pass into receptive appreciation and understanding by other minds.

Dr. Burns prefers to represent what takes place in the attainment of new values as a "pull" rather than a "push." He strives perhaps overmuch to separate his interpretation from any biological or quasi-philosophical doctrine of evolution, as implying that history is an unfolding of things always "there." The presentation of his horizon values in terms of "mutations" would be wholly unacceptable to him. He seeks to release life as much as possible from the determinist control of the past and to give the widest scope, I will not say to chance or miracle, but to determination by the hitherto non-existent. And yet his analysis of what occurs in discovery seems to yield as much importance to the past as to the future. For the belief in new truths and values to be discovered, the zest for the adventure of discovery, and the sense of the direction in which to look for the horizon facts, all involve the conception of a *hormé* more of the nature of a push than a pull. Probably Dr. Burns would admit that both are operative forces, though his stress is on the greater "freedom" which the "pull" seems to carry. For he clearly realizes how different types of genius, and different races or grades of humanity, will make different selections among the horizon facts. His treatment of the horizon does, of course, dispose completely of the cruder determinism of last century, for that implied that the history of a person, or a nation, or other society, repeated itself, that is, it excluded "novelty" in the true sense of that term.

A special interest attaches to the subtle defence which Dr. Burns gives for adding deity, in the sense of "the divine," to goodness, truth, and beauty in the category of general values. The enthusiasm of religion and its direction beyond the bounds of human morality appear to him to demand this place for the "divine," though he admits that "the common man," on whose nature he much relies for the roots of values, has little, if any, trace of it. He rightly disregards the fact that religion is a frequent breeder of illusions. For that objection in a considerable measure can be brought also against the arts and sciences, especially in the early struggles of any science towards exactitude. He sees and values highly a "new sense of deity." "It is not implied that the enthusiasm for fundamental social changes, the finer quality of human sympathy and the new delicacy of perception in a genuinely 'cultured' person actually constitutes a new religion. Such factors in experience do not, indeed, prove the existence of a keener sense of deity. But they are the *first traces* of a new religion and of a clearer vision of those aspects of deity which are now on our horizon" (p. 294). In this religion there is a place for what used to be called mysticism, those rare experiences outside the ordinary processes of thought and feeling, by which new heights of understanding of and of sympathy with the whole may be attained. How far, or whether there is a whole, Dr. Burns, however, seems to leave an open question; as far as his present interpretation goes, it is more pluralist than monist.

This is a very imperfect account of what I regard as a most important contribution to philosophy. Though, chiefly owing to the imperfections of language, made for common purposes by ordinary men and women, it is difficult in places, there are so many passages of entrancing interest that it must rank as one of the greatest and boldest intellectual adventures of our time.

J. A. Hobson.

Six Theories of Mind. By C. W. Morris, Ph.D., Associate Professor of Philosophy, University of Chicago. (Chicago: University of Chicago Press; London: Cambridge University Press. 1932. Pp. xi + 337. Price 20s.)

We have far more systematic knowledge of the nature of matter than we have of the nature of mind. Matter is, of course, much easier to study. Of the mind we have, however, a great deal more knowledge than we commonly give ourselves credit for, but the task of systematizing it is tantilizing. It is the standing paradox of things that the most intimate is the least comprehended, though the reason may be the simple one that we keep on trying to comprehend mind with the ideas and methods which have been of signal use to us in the study of matter. Psychology, that is, may soon have to repent of its alliance with the natural sciences. In the meantime the retreat, forced by this alliance, of philosophers away from the psychological to the properly philosophical problems of mind may result in insights which would provide a basis for a new and more sensitive psychology. The primary properly philosophical problem is that of the very definition of mind, and this is Professor Morris's problem, though his solution is quite antipathetic to the foregoing remarks. His book is a survey of theories which have already been offered, with the addition of an outline of his own solution, the detailed development of which is reserved for a future book.

He claims that all theories of mind fall under one or other of six types. He has elicited six categories and grouped various historical and contemporary theories according to the categories they emphasize. The categories are substance, process, relation, intentional act, substantive and function. The inadequacy of this mode of classification becomes evident when we find that, quite consistently, Berkeley is placed with Aristotle (substance), Bergson with Hegal (process), and Schopenhauer with Dewey (function). The affiliation of each theory is ruled by an abstract character instead of by its total and most distinctive bearing. Still, the classification is suggestive, and the examination of the several theories has independent instructiveness. With the exception of Critical Realism, each theory is sympathetically expounded and sympathetically criticized; the sections, indeed, on Laird, Lovejoy, Strong, Russell, and Dewey have passed under the scrutiny of their respective subjects. I admire the mastery with which the large and difficult material has been handled, and recommend the book as a valuable introduction both to the problem in its generality and to the main solutions of it which have so far been put forward.

To enter into details would be to become niggling. A fairer idea of the book is likely to emerge if I indicate first the meaning of the six categories and then what Dr. Morris requires any theory of mind to do. Mind as substance is, of course, an old notion, dominant until Hegel, and like most contemporary students Dr. Morris rejects it. He finds it too simple, highly ambiguous, and empirically unverifiable, and reminds us that the new logic of relations claims to be able to get along without it. The penultimate criticism reveals Dr. Morris's bias, but surely to require of so general a philosophical idea as that of substance that it be empirically verifiable is tantamount to reducing philosophy to a natural science. By substantive the author means a quasi-substantial unity without the division into substratum and attributes which the idea of substance is usually taken to involve; mind as substantive means a system of elements each of which would still be mental even if not integrated into a system. Under this heading Critical Realism is discussed, but the varying views of mind underlying the one

epistemology of this school and Dr. Morris's strong antipathy to this epistemology make this section very unsatisfactory. By process is meant not an activity of some entity, but an unsupported, entirely original activity. The Hegelian view of mind as expounded by Hegel himself, Bradley and Bosanquet, and the views of Bergson and Gentile here receive treatment. The chapter on mind as intentional act covers Meinong, Husserl, most of the English realists, and Whitehead. Here Dr. Morris concentrates on the English insistence on mind as awareness to the neglect of their equal insistence on that referential character of awareness, that intentionality, which he acknowledges in the title of his chapter. Mind as function, represented by Dewey (with a glance at Mead), and supported by Dr. Morris himself, means mind as (*a*) an activity not of a mental substance or substantive but of a bodily organism; (*b*) instrumental to the needs of the organism; (*c*) instrumental to action; (*d*) the rôle which natural events assume when they point to, stand for, symbolize, other natural events. Dr. Morris sometimes passes from one to another of the first three of these meanings as though they were synonymous. He is pleading the case of pragmatism, but his admission that the organism has intellectual—more than biological—needs takes all the pragmatic sting out of (*b*) and negates (*c*), or at any rate reduces this to the merely pious belief, expressed on p. 281, that it must be true even where there is no evidence for it. His main emphasis, however, is on (*d*). For him the distinctive feature of experience is that its elements (the objects of perception and thought) become significant of one another—fire of heat, St. Paul's of Ludgate Hill, water of purity, and so on; and he *defines* mind as this relation of significance or, to use his own term, symbolism. Personally I do not like this fashionable overworking of the term symbolism, muddling under it all forms of association (spatial, temporal, and that subjectively determined), logical implication, and causal connection; and the definition of mind as consisting essentially in this wide symbolism omits what in some pages Dr. Morris insists should be preserved, namely, the feature of awareness, or, as he prefers in his fear of subjectivism to call it, givenness. Doubtless he will clarify this and the other points when he comes to state his theory systematically in his next book.

Dr. Morris believes that any theory of mind, whatever conclusions it may embody, must retain two positions, namely, the givenness of perceptual objects and the mediateness of the knowledge-process (it is clear from the text that the only mediation he is thinking of is that of the causal sequence of physical and physiological events which precedes perception). It is, he thinks, the error of New Realism that it holds exclusively to the first, of Critical Realism that it holds only to the second. He holds them together by maintaining that the interaction of an event with a percipient organism, an interaction obviously mediate in the sense noted, brings into existence another event, which is the object and which is given (he carefully avoids saying "directly apprehended"). This, he says, is realism, because the given object, though produced in and by the interaction, is an existent in the same natural order which includes the interacting event and organism. But this is realism only if realism means the denial of subjective idealism. Dr. Morris certainly denies that the object of perception is a property or possession of the subject (which for him can only mean the organism), but he denies also that it is a property of the thing which we suppose ourselves to be apprehending. Its being a "real" *tertium quid* is here irrelevant; it *is* a *tertium quid*, and this makes the theory in its epistemological essentials the same as that of Locke, and unsatisfactory for the same reason. On such a view of mind as Dr. Morris propounds the term realism, together with its correlate

idealism, loses all meaning. If mind is not an entity *sui generis*, but simply a "symbolic" relation among such physical things as enter into a certain sort of interaction with a certain sort of organism, nothing can be either in it or out of it.

The obscurities mentioned are mostly due (apart from possible misunderstandings on my part) to Dr. Morris's desire to press to the uttermost the denial of mind as stuff, event, or original process—to be blunt of mind in any sense that offers even the slightest excuse for an idealism of the grand type. In him, as in so many other pragmatists, the ruling interest is not really epistemological but metaphysical, and the metaphysical interest is in an uncompromising naturalism. But, also like many pragmatists, he argues by predilection in epistemological terms; in this book he does so almost exclusively. Mind is unrecognizably cut down to what a naturalistic theory of knowledge requires it to be. It is simply knowing, or rather knowledge; what knows is the body; and what is known is something causally produced by the interaction between the body and the things which, though on this very theory admittedly unknown, must be known if we are to assert with any evidence that it is *their* interaction with the body that gives rise to the known object. Clearly I am unsympathetic to Dr. Morris's views, but I must repeat that his book is an able survey of other views and deserves to be carefully studied.

T. E. Jessop.

The Place of Minds in the World. Gifford Lectures at the University of Aberdeen, 1924–26. By Sir William Mitchell, K.C.M.G. (First Series.) (London: Macmillian & Co. 1933. Pp. xxv + 374. Price 12s. 6d.)

In his preface to this very important work the author states that he has recast the arrangement of his matter in the interval since the delivery of the lectures, and that though the argument will only be completed by a sequel to the present volume, which will deal with the Power of Minds, the book now issued is left "self-contained." It is none the less to be regretted that it was not possible to publish the two volumes simultaneously as a single work. The texture of the author's thought is too closely woven to make the division of his work into two books, separately issued and under two titles, as appropriate as it may have sometimes been in the case of other Gifford Lecturers. I do not think that the present volume *is* quite so "self-contained" as the author claims. Certainly the reader will feel that adequate appreciation of a philosophical work as difficult and as profound as this will be possible only when he has been able to study the sequel. The present notice will not therefore attempt to do more than give in a very summary and general fashion an indication of the main position adopted by Sir William Mitchell, and of the ground covered in the present volume.

With so much reason for gratitude to the author, it may seem ungracious to begin with a note of complaint. I shall, however, venture to express the deep regret, indeed the consternation, which many readers will probably feel at finding that the book has no index. I am convinced that Sir William's earlier important work on the *Structure and Growth of the Mind* would have been far more influential than it was had it not been similarly handicapped. Such a suggestion is, no doubt, highly uncomplimentary to the readers of philosophical books. The reader ought to be prepared to make his own index. But the fact has to be faced that without one a book does its work at a severe disadvantage. Is it too late to petition Sir William to indulge our human weakness so far as to equip the sequel volume with the aid he has denied us here?

It is true that we have to thank him, in this as in the earlier work, for a very careful analytical table of contents. But the reader is hampered in his references to this, helpful as it is, owing to the concentrated difficulty of the book, a difficulty which in the initial epitome is compressed into an intense obscurity. The book is undeniably hard, though as undeniably rewarding, reading. In part this difficulty is due to the regions traversed; we are conducted, for instance, through the history of the most recent physical science, relativity theory, quantum theory, and wave mechanics, in order to illustrate and fortify the author's argument, in a way that displays his own great erudition and familiarity with the literature but tends to perplex the less scientific reader. But the difficulty of the book is also due to the author's style, vocabulary, and characteristic quality as a writer and thinker. It is the price to be paid, though a price worth paying, for deliverance from the slick and the glib, from the trite phrase and the over-familiar presentation. Sometimes the result is a darkly cryptic or elliptical statement; often we have phrases of splendid vigour and expressiveness.

Sir William is not engaged, as for instance Dr. Whitehead is, in developing a technical philosophical vocabulary for fundamental notions; but he has a vocabulary of his own, too, a vocabulary of exposition. The reader has to be very much on the alert to recognize the special meanings which attach to his phrases, such as "gulf," "the line of life and the correlation-line," "the royal road," meanings which are, as the author would say, "taken for granted" the second or third time they are used. But his new mintings often admirably supplement the old well-worn familiar currency.

The main theme of this volume is the presentation of the author's view as to the nature of knowledge. He seeks first to display the inadequacy of certain contrasted accounts by which in one way or another the nature of cognitive (perceptual and conceptual) experience has been misunderstood. He considers, secondly, the problems to which these accounts give rise, and how these problems are met in terms of the account which he himself puts forward. And, thirdly, he seeks to illustrate and confirm his own interpretation by a review of, and a commentary upon, the development of the most recent theories of physicists. This, very roughly, is the subject-matter of the three queerly named parts into which his book is divided.

"Minds in living prove themselves, and . . . knowing is living, and not only a means to living. We may call the fact our principle" (p. 6). Neglect of this principle, or failure to interpret it concretely or comprehensively enough, leads us into sophistication, and especially gives rise to what Sir William Mitchell, with a touch of Heraclitean mystery, terms "the Gulfs." He means, I take it, interpretations which sever mind from its world, the world of real objects, and make thereby a chasm which proves unbridgeable, for instance an insoluble psycho-physical problem, or a representative theory of knowledge that presents us with an impasse. We come up to one or other of the "gulfs" if we take thought merely as instrumental, or make the confusion between object and stimulus, or take sansations as impressions, or assume that real things cannot be known, or again (the "practical gulf") make the severance between an objective world of objects to be sought and a subjective world of feelings to be satisfied.

On the other hand, the gulfs are transcended if we are faithful to the "living line." The fundamental error about the connection between mind and nature is to confound the living line and the correlation line. The living line is not within the brain, but between seeing the light and the light, hearing the music and the music, counting and number, plotting and the plot. The

correlation line within the brain is between seeing the light and the corresponding brain events" (p. 24).

This familiar similitude of light and seeing (only it is of course more than a similitude) boasts a noble lineage, but it is used repeatedly by the author with a force of his own to illustrate the inseparability of mind and its objects, though by no means in the manner of traditional idealism. Thus (p. 276) "theories are organs related to understanding as eyes to seeing, and related to their objects as eyes to light." "Reason makes things intelligible in the sense that the eye makes them visible" (p. 106). But if we follow faithfully "the lead given by the living line" we are in no danger of falling into the fallacies of subjectivism or positivism. "Following it (p. 190) we see nature to be partner with the organs of our grasp, including the organs that we create. The partnership is an articulation, not an echo. Theories prove, when they succeed, that they can be as physical as the eyes and brains that we inherit."

If one may be pardoned for applying so well-worn a label to one himself so fastidious in avoiding triteness of phrase, one would say that the author is in the main an uncompromising realist in his epistemology. "No object is made mental, nor altered, by being felt, imagined, or known in any way" (p. 33). "When your ideas quarrel with mine, and when they agree, it is because they claim to grasp the same object as mine, and to find it independent of our grasp" (p. 45). So too (p. 138) "such objects as the beauty of things, and their meanness or grandeur, are altogether found, and not added as a fancy. Yet they exist only for minds." And when I remember, I have not got merely some present substitute of the past event somehow "in the mind," but the very past itself. "It is yesterday itself, not a present image, that is held and is the sole object of my present thought. . . . As, in doing, I make real the very thing already ideal, so in recalling I make ideal the very thing that was real" (pp. 154–5).

In the third part of the book, which takes up nearly half the entire volume, the author reinforces his interpretations by a masterly survey of the living growth of the scientific understanding of nature in the prolific and bewildering development of contemporary physics. We are asked to follow what he calls "the royal road." This, if I may venture on a weak paraphrase of his account, is the way thought takes when ideas and theories become not merely instruments for grasping natural fact (to be modified and improved as new facts call for acknowledgement), but themselves the way of discovery by compelling their own supersession under the pressure of nature, our "partner" in the whole enterprise. "A notion is the means not merely of grasping but of seeking; and it secures an improving hold by taking one that must yield a better, if it fails when pressed home. That is the ambition of the royal road which we are to follow" (p. 195). In escorting the reader along the path of scientific discovery "from surface to depth in nature," Sir William builds up a formidable case against the anti-metaphysical positivism of the Mach type, still so popular among scientists. And it is a timely reminder, when another Gifford lecturer, Sir Arthur Eddington, can write as though the table of ordinary common sense were somehow less real than the scattered rushes of electronic energy into which physics analyses it, to be assured that "no discovery beneath the surface proves or disproves the physical existence of anything found on it. Physics confines itself to making the surface intelligible. The result has been to transform all views of nature copied from the surface, but still to question nothing there, nor prove it, for the surface proves itself" (p. 18).

But I have been already almost tempted into the sort of comment which

ought, as I have suggested above, to be deferred until the reader has the whole of Sir William Mitchell's argument before him in its entirety. Let me therefore conclude this notice by repeating that this is a book of the first importance, and that we shall await with eagerness and excitement the issue of the sequel.

J. W. HARVEY.

The Conception of God in the Philosophy of Aquinas. By ROBERT LEET PATTERSON, Ph.D., M.A., B.D. (London: George Allen & Unwin, Ltd. 1933. Pp. 508. Price 21s. net.)

The appearance of this able examination of the fundamental positions of the natural theology of St. Thomas may be taken as evidence that the Angelic Doctor is now accepted by English students of philosophy, outside the ranks of those for whom he is invested with the prestige of the authority belonging to an approved Doctor of the Church, as one of the world's great thinkers, the importance of whose contribution to philosophical speculation no longer needs to be defended against a tradition of anti-scholastic and anti-theological prejudice, but may be taken for granted, and its value criticized in detail with the same combined respect and freedom as we are accustomed to see used in regard to Plato or Aristotle, Descartes or Kant.

Dr. Patterson has greatly helped his readers by the abstract of his conclusions which he has prefixed to his work. Here we learn that (1) while disputing the distinctness in principle of the five proofs of the existence of God enumerated by St. Thomas, he holds the principle of these proofs to be sound, and not to have been destroyed by the Kantian criticism; (2) argues against St. Thomas that the distinction drawn by him between the knowledge *that* God is and the knowledge *what* he is, is illegitimate; that what Dr. Patterson calls his doctrine of degrees of being (which is by no means to be confused with Bradley's doctrine of degrees of reality) infects the world of finite beings with unreality; and that he fails in his attempt to harmonize the Aristotelian with the Christian conception of God; (3) points out certain difficulties in the doctrine of creation which constitutes so marked a distinction between the philosophical theology of the Christian doctors of the Middle Ages and that of their master Aristotle; and (4) discusses St. Thomas's view of the possibility and extent of a mystical knowledge of God attainable during this earthly life.

The present reviewer would be inclined to agree with Dr. Patterson with respect to (1)—Father D'Arcy, by the way, is of the same opinion as to the essential identity of the several proofs of God's existence—and to a considerable extent also as to (2). Nevertheless, both in respect of the doctrine of degrees of being (we might perhaps better describe it as the doctrine of a distinction between Being and beings), and also in respect of (3), the doctrine of creation with which it is so closely connected, he is of opinion that what Professor Gilson in his recent Gifford Lectures on *L'esprit de la philosophie médiévale* picturesquely calls *la métaphysique de l'Exode*, with its ascription to God of the totality of being, while at the same time it denies that his being *includes* the finite "beings," which are on this view not portions of God or emanations of God, but his creatures, requires a fuller examination of its relation to the great systems of modern philosophy than it has yet perhaps received either from writers too ready to regard it as a standpoint left behind by the progress of thought or from those who (like Professor Gilson himself) are, on the other hand, too much disposed to regard those systems as the "ruins" of a synthesis destroyed by the indifference of

sixteenth-century reformers to the importance of the contribution made by Christianity to the understanding of the universe. With respect to Dr. Patterson's *fourth* point, I should say that, apart from any considerat ion of St. Thomas's personal temperament, good historical reasons can be given why he and other mediaeval thinkers did not allege what we call "religious" (which is by no means to be restriced to "mystical") experience as a proof of the existence of God.

Dr. Patterson is unquestionably right in paying close attention to St. Thomas's theory that, where the same predicates are used both of God and of creatures, they must be taken neither as *univocally* nor as *equivocally*, but as *analogically* applied to both. For this theory is at once vital to his theology and the source of many difficulties. But our critic is perhaps too much concerned to convict his author of inconsistency in respect of the question whether *being* may be called a *genus*. Because he speaks incidentally of *being* as the *genus* which is subject to the art of God as the class of houses is to that of the builder, he is not to be supposed to have forgotten the Aristotelian doctrine that "being" transcends the categories, or to have committed himself to the confusion, which he elsewhere imputes to David of Dinant, between the utter *diversity* of God, as pure act, from prime matter, as pure potency, and the *difference* of one species from another within the same genus—a difference which (David suggested) could not be discovered between two *simple* beings, such as God and "prime matter" were alike held to be.

Whatever dissatisfaction one may feel with this or that contention or argument of Dr. Patterson's, his work is a serious discussion of real difficulties presented by his author's philosophical theology which is worthy of the attention of every student of St. Thomas. It is not, however, free from errors, not only of the press (there is an unfortunate misprint of *quia est* for *quid est* on p. 256, l. 16, in a passage wholly concerned with the difference between the two), but sometimes also of translation. Throughout the book inaccuracies in the printing of the Latin passages are frequent; and there are numerous mistakes in translation which suggest less familiarity with Latin in general and mediaeval Latin in particular than one could wish in a commentator on St. Thomas. For example, on p. 61, where "any circulation is finite" should be "any revolution of it" (*eius* is left untranslated), *i.e* of the sun, "is finite"; and on p. 486 the whole sense of a long passage is misrepresented owing to the failure to observe that the *hominis operatio propria* is distinguished from and not identified with the *operatio quae solis intellectualibus inhaeret*, while this latter expression is itself misunderstood. Dr. Patterson has an odd habit of translating *quodammodo* "in some mode," thereby suggesting a technical meaning which is usually absent. In the passage from Aristotle, *De Anima*, iii. 7, quoted on p. 67, ἄλλο εἶδος τοῦτο κινήσεως does not mean—though, in so taking it, Dr. Patterson is following Hicks—"a different species of motion," but (as Professor J. A. Smith renders it) "a different kind from movement." In the quotation from Clement of Alexandria (p. 102, n. 1), the first word Λάθοιμεν is of course a misprint for Λάβοιμεν; αὐτῳ in l. 3 cannot refer to ἀνάλυσις, but to ὁ ἐποπτικὸς τρόπος; and the last clause should be rendered "and yet they have been written of him" (*i.e.* in the Scriptures).

In the second note on p. 419 Dr. Patterson is not unnaturally surprised to find St. Thomas apparently contradicting himself in two successive sentences by saying both that "the things that now are" *habent potentiam ad non esse*, and that some of them are *necessaria absolute*. He acutely suggests that *quae iam sunt* must refer only to sublunary things. No doubt

this is so; yet, as it stands, it cannot be so taken without doing violence to the text before us; and it seems to me that we must certainly emend *iam* (which is quite pointless in the context) to *ima*, a word which gives the required sense and, as written in manuscripts with the *m* represented by a mark above the line, is very easily confused with *iam*.

By the way, the Oxford translation of the *Metaphysics* should be attributed to Dr. Ross, the present Provost of Oriel, and not to "Smith and Ross," the original editors of the whole series.

C. C. J. Webb.

Proclus, The Elements of Theology. A Revised Text with Translation, Introduction, and Commentary. E. R. Dodds. (Oxford: Clarendon Press; London: Humphrey Milford. 1933. Pp. xlviii + 340. Price 30s.)

Both Professor Dodds and the Oxford University Press deserve to be heartily congratulated on the publication of this very arduous and thorough piece of philosophical scholarship. The work has been executed with all the usual excellence and care of the Clarendon Press (no slight task in view of the fullness of the *apparatus criticus*), and it is, doubtless, due largely to the well-known diligence of the Press's proof-reader that hardly a misprint is to be detected in all its pages. Professor Dodds's own task has been an elaborately complicated one, with several distinct departments. He has had, in the first place, to establish the true text of a work hitherto wretchedly disfigured by the ignorance or incompetence of its two previous editors, Portus and Creuzer.

This has involved the examination and collection of a large number of MSS. both of the Greek text and of the thirteenth-century Latin version (as yet unprinted) of William of Morheke, as well as the collection of curious information about the Georgian and Armenian translations, and an elaborate attempt to construct a "family tree" of the known MSS. Further, the meaning of the often obscure doctrines of Proclus has had to be fully discussed, as they have had to be set in the right connection with the teaching of Plotinus, the one man of outstanding original genius among the Neo-Platonists, as well as with the post-Plotinian developments due to writers like Iamblicus and Syrianus, whose work has only survived in part; and Professor Dodds has generously added to his task by gallant attempts to trace the filiation of Plotinus himself to Plato backwards through a series of precursors—the famous polymath Posidonius being the most important of them—whose writings are no longer extant. It has also been necessary to take account of the singular way in which the "theology" of Proclus, devised as a sort of last refuge for traditional Hellenic polytheism, was, within the century after his death, superficially Christianized—in a way—in the writings fraudulently fathered on "Dionysius the Areopagite," and thus furnished an important element to the great philosophical constructions of the thirteenth-century thinkers, and through them left a permanent mark on the thought and language of the great modern philosophers from Descartes to Leibniz. Finally, the mere task of translation, involving as it does the finding of satisfactory equivalents for the very elaborate technical terminology of a largely extinct "rationalism," must have been itself sufficiently arduous.

Professor Dodds appears, so far as I can judge, to have executed these very different parts of the duty he has imposed on himself in a way which demands very high praise. The relation of the MSS. sources for the text is discussed with evident scholarly competence, the critical apparatus is clear

and full; [of the accuracy of the actual collations, of course, only one who had examined the MSS. for himself as widely as Professor Dodds could speak with authority;] and his own "emendations" are eminently sober and often absolutely convincing. What he has done in this way for the text of his author will only be fully apparent to those who have had in the past to wrestle for themselves with the *editio princeps* of 1618, or the amazing productions of Creuzer. The difficulty of translation has been admirably overcome. If ever I have felt any misgiving about the terminology adopted, it has been almost exclusively on one point, viz., on that of a satisfactory equivalent for the word *ὑπόστασις*, often rendered in the English *substance*. Here I own to a certain misgiving due to the fact that *substance* in our philosophical vocabulary retains all the suggestions of the Aristotelian *οὐσία*, and that *ὑπόστασις* and *οὐσία* are not exactly coincident terms. (Thus, for example, the "persons" of the Christian Trinity were quite correctly described by the theologians as *ὑποστάσεις*, but no theologian could have admitted that they can properly be called *substantiae*.) At the same time I freely admit that if the word *ὑπόστασις* was to be translated at all, and not merely transliterated, I do not know of any alternative rendering which would not have been open to even graver criticism. Professor Dodds has probably done the best that could be done in the matter, though I could wish that he had somewhere called attention to the point that *substance* as a rendering of *ὑπόστασις*, must not be equited with the *substantia* (*οὐσία*) of Aristotelianism. In every other way the English reader will, I believe, find the translation a thoroughly adequate substitute for the actual Greek text (unless, perhaps, as very minor points, I might suggest in Prop. 86 *ἐν ποσῷ* means *in number* rather than *in quantity*, and that in Prop. 97 *coincidence* would perhaps convey the meaning of *ἀπὸ ταὐτομάτου* rather better than the word actually chosen, *spontaneity*. It occurs to me that Leibniz, who make so much of *spontaneity* in his own metaphysics, would have absolutely denied, no less than Proclus, the presence anywhere in the world of the random variation which Proclus here calls *τὸ αὐτόματον*.)

The supreme services of Professor Dodds to his author lie, however, mainly in the field of *interpretation* of his doctrine in its historical relation to that of predecessors and successors. Even in the mangled text of Portus or Creuzer an intelligentreader can contrive to make out the sense of the author not unsatisfactorily if he sits loose enough to their unintelligent punctuation. The chief need of the student was for an intelligent treatment of the questions: (1) exactly where the world-scheme of Proclus differs from that of Plotinus, and how far the departures are due to his own initiation; and (2) how much of it, and in what form, has passed into the thought of Christian scholasticism. And it is on these points, especially on the first of them, that I find Professor Dodds's Introduction and Commentary everywhere enlightening. The first question is actually treated more fully than the latter, and I think the writer would at once admit that it is the one with which he is more at home. The illustrations of Proclus from thirteenth-century thought, like that of St. Thomas, are welcome and apposite; but a certain unfamiliarity with the subject is betrayed, *e.g.*, by the statement that Christian thinkers taught, as against Neo-Platonists, the "Creation of the world in time." (What they really taught was something rather different, that time, as we read in the *Summa Theologica*, was "created along with the world," a formula expressly intended to exclude the notion of an "empty time" *before* the creation, and quite in keeping with the marked trend of present-day speculation in physics.) And it is unfortunate that by some mere oversight language should have been used on p. 251 that would inevitably suggest to a reader unacquainted

with the facts that Athanasius "echoed" the thoughts which had been taken by Augustine from Plotinus, since of course Professor Dodds knows the real chronology.

For the pains which have been taken over the tracing of the ancestry of Proclus's ideas there can be nothing but praise. The effect, I believe, is once and for all to reduce the originality of Proclus within very narrow limits; indeed, I think Professor Dodds fully makes out his case for the view that the innovations on Plotinus in the *Elements of Theology* are very largely due to Iamblichus, and that the most striking of them all, which does not appear to owe anything to Iamblichus—the intercalation of an order of "divine henads," identified with the gods of the traditional mythology, between the "One," and the series of "Intelligences," is the invention not of Proclus himself, but of his teacher at Athens, Syrianus. I would also say at once in this connection that I fully accept Professor Dodds's remarks on the impossibility of making as close a parallel as I once tried to make, in an essay which he perhaps honours with more attention than it deserves, between this curious doctrine and the account of the attributes of God in Christian scholasticism. I can only apologize for my own exaggeration by pleading that the thought in my mind, not sufficiently developed for lack of space, was that the scholastic doctrine itself has close affinities with Philo's teaching about the δυνάμεις of God (also referred to in the same connection by Professor Dodds). I meant, in fact, that all these doctrines are attempts in some way to find a mediating term between the world of multiplicity and a principle of absolute unity. But I admit at once that it ought to have been added that they do not all construct the bridge in the same way.

When the attempt is gallantly made to get back behind Plotinus himself and to seek the antecedents of his doctrine in the now utterly lost writings of thinkers who connect the third century A.D. with the Old Academy, it must be admitted, I suppose, that we are on ground where certain results are never likely to be obtained. I take it, in particular, that Professor Dodds himself would grant that the interesting speculations, in which he tries to follow some modern German students, in reconstructing the ideas of Posidonius are problematical to the last degree. Perhaps our greatest living Latinist went a little too far in the opposite direction when he claimed it as a merit of his *Manilius* that Posidonius is never named in its pages, but it still remains true that after all we know very little in detail of what Posidonius taught, and that to attempt to reconstruct his "system" is building a house of cards. There is a lesson to be learned from the fate which seems already to have overtaken similar modern attempts to "reconstruct" a much earlier writer, Antisthenes, out of a couple of allusions in Aristotle.

I would add that I believe Professor Dodds has finally established the —to me—unpleasant fact that, though the *Elements of Theology* only allude to the matter in a covert way, Proclus was an adept in the "theurgy" into which the noble philosophical religion of Plotinus was degraded by Iamblichus and the Syrian school. This is perhaps not surprising. It is, I think, impossible not to feel that with all his intellectual acuteness and all his respect for Hellenic traditions, Proclus was not really a "religious man"; he had no living faith, as Plotinus had, and its place had to be taken by superstitions about the "symbols" of theurgy, as it might have been taken in a different age by a cult of "relics." His knowledge of the letter of Plato must have been infinitely more correct than that, *e.g.*, of St. Augustine, but the "spirit and the life" of Platonism came down to a later world though Augustine and not through Proclus.

A. E. Taylor.

History of Indian Philosophy in Eight Volumes, Vol. 7: *Indian Mysticism.* By S. K. Belvalkar, M.A., Ph.D., and R. D. Ranade, M.A. (Part 1:) *Mysticism in Maharashtra.* By R. D. Ranade. (Poona: Aryabhushan Press. 1933. Pp. 46 + 496 + 10. Price Rs. 10. Library edition, Rs. 15.)

This History of Indian Philosophy, now in progress under the patronage of the University of Bombay, is the most comprehensive one yet undertaken. Only two volumes have so far appeared, viz., vol. 2 (dealing with the Upanishads) and vol. 7, part 1, now under review.

The Preface (35 pages) makes a feeble attempt at comparing the mystics of Maharashtra (the greater part of which country now belongs to the Bombay Presidency) with those of the West, especially Jñāneśvara with Plotinus, which is rather hazardous (the comparison of Chokhāmeḷā, the untouchable, with Jacob Böhme is absurd), and discusses in a general way some points, such as the "Dark Night of the Soul." The Introduction then gives us a preliminary survey of the development of mysticism in the several parts of India. Then there follows Part I dealing with the "Intellectual Mysticism" of Jñāneśvara and his age, and covering nearly one-third of the volume. The remaining parts are: (II) "The Age of Nāmadeva: Democratic Mysticism"; (III) "The Age of Ekanātha: Synthetic Mysticism"; (IV) "The Age of Tukārāma: Personal Mysticism"; and (V) "The age of Rāmadāsa: Activistic Mysticism." The labels for the several periods are, most of them, aptly chosen: the predominant note with Jñāneśvara is, indeed, his Brahmanic intellectualism; with Nāmadeva, the tailor, and his disciples (a potter, a gardener, a goldsmith, an untouchable, a maid, a barber, a dancing-girl), the emancipation of the popular mind; with Tukārāma, the trader, his pathetic self-record; and with Rāmadāsa, the Brahmin, his vigorous activism. As to Ekanātha, however, we do not think that his "tendency of making compatible the love of God and the rightful performance of Duty" is nearly as prominent as his persistent endeavour, unheard of before, to throw open to the whole nation the treasure-house of Brahmanic sacred lore reserved until then to the Sanskrit-knowing aristocracy. Why not call this mysticism, which inspired a Śhivājī, and has admittedly been a powerful factor in the formation of the Marāṭha kingdom, a "nationalist mysticism"?

As part of a History of Philosophy this volume is curiously disappointing. Turning over its pages we rub our eyes and cannot find history of philosophy in it and but little of philosophy proper, until at the end of the work we are enlightened by the amazing confession: "The philosophical aspect of mysticism we have hardly any time to enter into in this volume"! This task, we are told, "shall form the subject of a forthcoming work on the 'Pathway to God.'"

This failure to produce the kind of work we were entitled to expect is a result of the unfortunate habit of not insisting, in the case of encyclopaedic works of an historical character, on the publication of the volumes in their chronological order. Only with constant reference to the preceding volumes would it have been possible to point out the progress of philosophy in Indian mysticism; those volumes, however, were not yet published and, probably, not even written, and a good deal of even their textual material has not yet become accessible in print.

The volume before us gives the *materials* on which, together with those to be given in its second part, the inquiry on the rôle of philosophy in Indian mysticism will have to be based. It gives *monographs* of the Marāṭha mystics: their biographies (with detailed discussion of the chronological data) and their views, and the latter are described in a way (viz. "by heaping similes over similes and metaphors over metaphors," p. 161, said of Jñāneśvara),

which makes one regret that the author has not cut down this part to half of it and made use of the remaining space for doing what he could as an historian of philosophy. For, that he could have done something of this sort the book itself shows. It is quite sure, *e.g.*, and our author himself says so (p. 178), that "Jñānadeva had come definitely under the influence of the Śiva-sūtra philosophy" of Kashmir. Many works of the latter being available in excellent editions, the subject could have well been given the detailed inquiry it demands instead of merely hinting at it. The "Sphūrti-vāda" is (on p. 158) introduced as being Jñānadeva's "original contribution to philosophic thought"; but in the section devoted to it we fail to discover anything original, nor is there an attempt to show what the originality consists in. The term also is not explained (and is, moreover, missing in the copious "Index of Names and Subjects"), it being left to the reader to guess that *sphūrti* "vibration" or "breaking forth visibly," is the same as *spanda*, and, consequently, an admission, by Jñāneśvara, of this theory being not his own but of Kashmirian origin. Among the original contributions, of which there are not many, we might perhaps count Rāmadāsa's theory (not sufficiently marked out) of the four Selves, viz., of the Life-Self (= individual soul), the Śiva-Self (or personal God), the Highest Self (or world-soul), and the Spotless Self (or Absolute) (p. 386). But even this doctrine is not really original, as shown by the Pāñcarātra theory of the five so-called *prakāras*, or modes of being, of God.

But though the work has missed its object, or what should have been its object as part of a history of philosophy, it cannot for that be declared valueless. For it is the first comprehensive work on mysticism in Maharashtra. It gives a mass of materials practically arranged and much of which (as almost the whole chapter on Jñāneśvara) has so far not been available to the English-reading public. It will be specially appreciated by those who can compare its numerous quotations with their Marāṭhī originals published in the companion volumes to the present work, viz., the four "Source-books of Indian Mysticism" (obtainable for Rs. 5 only the set). An appendix in this volume serves immediate identification of each quotation with its original in the "Source-books."

F. Otto Schrader.

Neue Wege der Philosophie—Eine Einführung in die Philosophie der Gegenwart. By Fritz Heinemann. (Leipzig: Queller and Meyer. 1929. Pp. xxviii + 434. Price RM. 6.20.)

It was a theory of Martineau's that the differences between the several periods of philosophical development might be explained by a curious characteristic of human thought. The speculative curiosity of men moves about, he points out, through the circle of three great objects: God, Nature, and the Soul, and is ever attempting to determine the relations subsisting between them. The human mind has, however, a tendency to place its objects in antithesis, finding them more intelligible where they shed the light of contrast upon each other. The effect of this "dualism of the intellect" has thus far been always the same: that one of the objects has either been silently absorbed into the other two, or has been left outside both, with no definite relation to either and an uncertain chance of recognition at all. Moreover, each of the three elements, the human, the cosmical, and the Divine, has in turn failed of its just rights. The Greeks engaged themselves with God and the Cosmos, and not with man as separate from these; the Christian Church was absorbed

in the relation of God to man, and treated nature as subservient or accidental; whilst modern speculation investigates the relations of man and nature, either identifying God with the latter, or conceiving him as essentially external to both.[1]

Whilst this explanation of the divergences between these historical periods is too suggestive to be summarily dismissed, it is hardly possible to accept it without qualification. The antithesis of God and the Cosmos seems particularly inapt as the differentiating mark of Greek thought, doubtless because the other pole to which man is wont to set his metaphysical objects in opposition is normally himself as the thinker. It is his own relation to the world, to God, or to his fellow-men, that has engaged his attention in every age of speculation. Hence what distinguishes modern from classical thought is less the objects it seeks to relate than its method of relating them, with the change of emphasis that this implies.

It is the specific character of the method employed by the centuries between A.D. 1600 and 1900, and the causes of its almost complete breakdown in the twentieth century, that Dr. Heinemann has described for us in the present volume. If human existence be defined, not in terms of an obsolete theory of substance, but as "a unity of forces in reciprocal action," or, from a more external point of view, as "a system of relations of being, meaning, and value" (p. 17), it will be apparent, he thinks, that what varies from one epoch to another is the centre of reference of this system. In classical thought man was a factor in the undivided, organic whole of the Cosmos; the unifying concept of mediaeval civilization, on the other hand, was a God who stood in relation to the subject as his transcendent source or creator; what distinguishes the philosophical tradition started by Descartes from both these earlier standpoints is the removal of the centre of reference from without to within. Its systematizing principle is the unity of the subject itself; its procedure is not the determination of thought by the world but the determination of the world by thought. Where the immanent Logos is rejected and the transcendent Logos is denied its function, the only remaining course is to rebuild the world-order from within the subjective Logos (p. 41). Without denying the importance of the numerous counter-movements that have arisen, we may regard the principal types of philosophy from Cartesianism onwards, through Leibniz, the English empiricists, Kant, and the nineteenth-century idealists, to the positivists, Neo-Kantians, and Neo-Hegelians of the last thirty years of the nineteenth century, as but varying applications of a single principle, which treats reason as the sole vehicle of knowledge, leading to the mechanization of science, and resulting in the social realm in the rise of an industrial bourgeoisie.

In contrast to the uniformity of this historical epoch, the first thirty years of the present century are admittedly a period of crisis. And this crisis, Dr. Heinemann claims, is much more than a scientific or philosophical, or even than a cultural or spiritual crisis, it is a crisis of humanity itself. What he believes to be the way of delivery that is in process of discovery becomes clear in the course of his investigation. It is evidently his view, however, that the philosopher's task is rather to understand such a situation in its manifold historical, psychological, and sociological aspects than to furnish the solution of its problems. Hence the main object of his book is an analysis of the present crisis in thought, the chief interest of which for his English readers, as doubtless also for his German compatriots, will be his deliberate application of the method, which he has described in the chapters on Dilthey

[1] James Martineau: *Types of Ethical Theory*. Third revised edition, Oxford, 1889, Vol. I, pp. 123 f.

and Simmel, of interpreting the world through its history. If we regard history, as these writers do, as a dynamic interrelation of forces, having each its own meaning and value, it should be possible for us, through our common humanity, to bring our many-sided experience to bear upon the events of other lives in other eras, and so "to infuse with new life the bloodless shadow of the past" (quoted from Dilthey, p. 204). To understand the present crisis we need to cast our minds backwards in this way, and to re-live the principal phases of the "subjectivism" for which the cosmic structure necessarily corresponds to the structure of mind itself, and reason is thus the medium of absolute knowledge.

We find the source of this position in Descartes' theory of an isolated consciousness as the starting-point of speculation, which can thus have access to no reality beyond its contents, form, or products. There have been three main variations upon this theme, according to whether consciousness is regarded as the mere sum of its contents, as the productive source of these, or as the source of its formal principles. As each of these positions has been reformulated in the last fifty years, and as it is naturally these later formulations in terms of recent scientific thought that have had the most direct effect upon contemporary speculation, it is to the latter, *i.e.* the fictionalism of Vaihinger as a late representation of Positivism, the Neo-Kantianism of the Marburg school (Cohen and Natorp, and less characteristically Cassirer and Nicolai Hartmann), and Italian Hegelianism (Croce and Gentile), that Dr. Heinemann devotes most attention. These schools, however, mark the close of an epoch; hence their chief interest necessarily lies in the reaction they have excited. It is therefore his later chapters describing the recent counter-movements to Subjectivism that are likely to attract most attention.

The trend which he is able to trace in all the more significant aspects of contemporary thought, in history, psychology, biology, sociology, is the trend towards *existence*, in the sense in which Kierkegaard first defined it, as a synthesis of being, value, and meaning; in other words, it is a return from the abstract rationalism and one-sided subjectivism of the Cartesian tradition in all its varying forms to a search for a more concrete reality. Within this movement we must, however, distinguish two separate stages, the second of which is only at the present time developing in the work of the author himself and a group of his contemporaries, so that it cannot as yet be viewed under the perspective of history.

The first stage is simply the inevitable reaction of *life* in its irrational aspects against abstract reason as the sole source of knowledge. The historical representative of this reaction is, of course, Nietzsche, whose war of instinct against intellect is discussed in most of its bearings. Despite its importance as a very spectacular counter-movement, however, it is but one of the many phases of the same trend towards concrete existence of which Bergson's intuitionism is a more constructive example, though even this is of less importance than the contribution of those thinkers who have invoked history as the most fruitful medium of knowledge, time being with them the basic form of existence. Of this movement Dilthey is, of course, the pioneer, though their not wholly successful efforts to relate the process of history to the Idea render the work of Troeltsch and Simmel of sufficient importance to receive separate treatment. A similar defence of the priority of the irrational is characteristic of most of the recent movements in psychology (psycho-analysis, behaviourism, characterology, etc.), which have unanimously protested against the introspectionist's exclusive attention to consciousness as the field of psychological investigation. Though the work of Max Weber is actually a defence of rational explanation, attention is drawn to his social philosophy, not as a late phase

of nineteenth-century rationalism, but as an example of the use of the historical method in sociology, where it is his endeavour to understand the individual, not through his actual situation alone, but through the further discovery of all his social and economic potentialities.

It is not difficult to see that, for all their claim to concreteness, the countermovements of this stage are actually as abstract, in the literal sense of that term, as the subjectivism they oppose. For, if concrete existence defies presentation through the formal constructions of reason, it is no more completely manifested in the formless and undirected flow of an irrational instinct or life-force. The truth which these writers overlooked, but which is beginning to receive notice in the second stage of the "trend towards existence," is that, though form without matter is admittedly empty, concrete existence is no mere ὕλη which, where the constructions of reason are rejected as extraneous, remains a blind and undirected stream; it is rather always and necessarily an existence with its own characteristic form. The greatest need of philosophy to-day is a foundation in a concrete anthropology, which shall present the life both of the individual and of society as an existence having an immanent structure. We find movements in this direction as early as the middle of the nineteenth century. Dr. Heinemann mentions Feuerbach, Marx, and Kierkegaard as exhibiting in their diverse ways this common tendency. Kierkegaard's refusal to accept as the essence of man an "objective thought," transferable from one human being to another, and thus destructive of the qualitative differences between them, even between man and God, seems to him particularly significant as a turning-point in speculation. The most systematic, and doubtless most lasting, contributions to this philosophy of the concrete are, however, appearing among the present generation, where the same trend is apparent in many fields. The work of the *Gestalt* school, both in psychology (Wertheimer, Köhler, Koffka) and in biology (Driesch), is of great importance here, and has the outstanding merit of having abandoned the presuppositions of the metaphysic of substance and treated man, not as a system of attributes complete in itself, but as an element in a field of forces, and thus inseparable from, and explicable only by reference to, his environment. The introduction of the phenomenological method has also proved of immense value, since it is precisely the method of explaining the existent by its immanent structure and not by superimposed principles of organization. For this reason a substantial portion of the book is devoted to an examination of the doctrines of Phenomenology.

In its earlier phase, as presented in the work of Husserl, it is important to distinguish its methodological from its logico-ontological doctrine. As affording access to new aspects of the real the former represents an advance that has proved immensely fruitful in several fields, notably in psychology and psychiatry. The tendency of the latter to raise consciousness to the status of an absolute must, on the other hand, be deprecated as a reversion to the subjectivism from which this method should have afforded a final escape. Here too, however, there is a definite movement towards concreteness in the treatment of the mental act and its content as correlative factors in a phenomenon that embraces both. More important still as representative of the present situation is the work of Max Scheler, the typical "crisis philosopher," in whom the opposing strata of life and mind appear in a characteristic mixture of attraction and repulsion. Inevitably, however, he is rather a victim of the crisis than a deliverer from it. Though his attempts to establish ontologies of value and of the Divine, through the recognition of feeling as the vehicle of a stratum of being not apprehensible by intellect, are of some

interest, the only substantial and lastingly valuable product of these investigations is, in Dr. Heinemann's view, a psychology of the emotions, the more ambitious ontological speculations being examples of the vicious metaphysics that confess acknowledgment of the absoluteness of the absolute (*i.e.* the refusal to treat it as on the level of the relative) with the actual apprehension of absolute being. Nor is the extreme dualism of his later period, according to which the blind forces of nature may be directed by a mind that is devoid of dynamic power, at all a convincing explanation of the real harmony that exists between them. Their opposition is not overcome by exhibiting them as a thesis and antithesis for which a synthesis is to be sought, but rather by showing the opposition itself to be no more than apparent (see Preface, p. xix). Of the value of the latest presentation of phenomenological theory by Martin Heidegger, Dr. Heinemann is less decided, as this was not completely formulated at the time of the publication of his own book. Whilst he criticizes its metaphysical superstructure as tending to conceal rather than to reveal the important problems at issue, he is inclined to regard Heidegger's recognition of an existence containing its structural principles within itself as one of the most important philosophical discoveries of the age. His doctrine of time as the form of all existence, and thus as the principle through which reality itself, and specifically the real nature of man as a historical existent, is to be understood, furnishes a formal anthropology which is needed as a supplement to the anthropological material yielded by the comparative studies of Dilthey, Simmel, Weber, and others, and thus reveals the internal connection of several strata of experience, *e.g.* the historical and the religious.

Now if Heidegger's view of historical existence be the true one, the development of thought through a historical period such as Dr. Heinemann has described should be self-explanatory. Whether, however, it is really possible for the philosopher of history so to identify himself with the process he describes, that his interpretation is actually history's explanation of itself, free from all taint of personal bias or subjective colouring, is a matter upon which very serious doubts may be entertained. It is questionable whether the most disinterested inquirer can ever wholly disentangle the verdict of history upon itself from the meanings read into it by a later generation with its own characteristic sympathies and desires, its zeal to direct the trend of events towards the ends it holds desirable. But, where such a doubt arises, a historical investigation of the kind here undertaken must appear as no more than a prolegomena to a systematic account of the position under the perspective of which the trend of historical development is viewed. It is greatly to be hoped, therefore, that Dr. Heinemann intends shortly to present us with his own "philosophical anthropology," some of the most important implications of which are apparent in the present work. In the meantime we are indebted to him for a very vivid and sympathetic account of the crisis in contemporary thought, as seen in the light of its historical antecedents. The book will serve the double purpose of familiarizing his English readers with the principal doctrines of several important continental schools of thought and of introducing them to a position with which they are likely to be unfamiliar, but which is beginning to exercise considerable influence upon the thought of Germany to-day.

MARY E. CLARKE.

The Return to God—a Catholic and Roman View. By the Rev. Father L. J. WALKER, S.J. (London: Arthur Barker, Ltd. Pp. 223. Price 5s. net.)

The interest of Father Walker's book lies largely in the fact that it is a contribution by a Jesuit to the literature, not, as might be expected, of

Thomism, but of that Christian Platonism which, as Dean Inge is fond of urging, is part of the tradition of English religious thought. "Before men can return to God," Father Walker begins, "they must first believe in Him," and in these days must have reasons for their belief; and, while he does not disavow the reasons traditionally advanced by Thomism, he feels that the Platonist and Augustinian arguments are perhaps more likely to carry conviction at the present time.

He invites us to consider the significance of the various worlds to which we are introduced in dreams, in art, in mathematics, and in moral experience. No one of these worlds, he argues, exists *sub specie temporis*, but they all have being and objective reality. The object of mathematics, for instance, is not the symbols which it employs, nor any mental construct, but the invariable relations between the ideas which its symbols represent. Similarly, moral obligations are not the creation of our minds; we simply apprehend them, and, in apprehending them, recognize their binding character. All these worlds, he continues, point beyond the distress and striving of this world to the existence of a reality, the One and the Good, from which they all flow and in which they are all comprehended.

Father Walker covers much ground in little space, and always writes brightly and persuasively; and, although his book is addressed rather to the general reader than to philosophers, it would be doing less than justice to its philosophic temper not to treat it seriously and go on to criticize it by pointing out a place where its argument seems to be incomplete, and where its author seems to forsake Plato's guidance.

The difficulty is to understand what relationship there is between his objectively real worlds, or what warrant he has for advancing from a plurality of worlds, each neatly severed from its neighbour, to a unity inclusive of them all. For, if we contemplate a plurality of equally real cinematograph films of varying merit and interest, we shall never attain to grounds for believing them all to be the work of one designer unless we can detect in each one of them the working of a single principle of technique or method. No such single principle is observable in the worlds which Father Walker describes. For instance, they do not seem to be regarded by him as grades of appearance each one nearer the real, or more adequately symbolic of the real, than its predecessor. Mathematics is said to be indicative of invariability, moral ideals of goodness; but he leaves us wondering what ground there is for ascribing these qualities not merely to the worlds in which they are discovered, but to one single principle that transcends and incorporates them both. It is true that, in describing the One, he tells us that each of the worlds expresses it in different degrees, but this is jumping to his conclusion—Unity—and then letting down a ladder afterwards to help himself up to it; to use that ladder, however, could only be justified if he then went on in the light of the One to reinterpret the meaning of each of the worlds in which it is expressed. No such reinterpretation is given, and, indeed, to have given it would have involved giving an account, as Plato did, of the various ways of knowing, and, possibly, revising the assumption, apparently made throughout, that the various real worlds simply impose themselves on a passively receptive mind, like images on a photographic plate.

In the last three chapters of the book the philosopher gives place to the Catholic apologist, and philosophers who do not share Father Walker's faith may then find their interest flag; but ample compensation for this is contained in Chapter II, the longest in the book, which is a lucid, compact, and fascinating summary of religious movements of the sixth century B.C. in India, in China, amongst the people of Israel, and in Magna Graecia.

T. M. KNOX.

Storia della Filosofia. Parte Quarta: La Filosofia Moderna. I, L'Età Cartesiana. By GUIDO DE RUGGIERO. (Bari: Laterza & Figli. 1933. Pp. 366. Price Lire 25.)

This is the eighth volume of the author's remarkable survey of the philosophy of the Western world. It is as impressive as its predecessors, and deserves a far wider reading than it is likely to get. To have so beautiful a language as Italian as one's native medium of expression is a piece of good fortune, and to handle it so resourcefully and yet so austerely as Professor de Ruggiero does is a high personal attainment; but, unfortunately, the fine result is not available for everybody. If the History were smaller I would strongly urge translation, for it is unique in its execution and, being richly suggestive, is of great educational value. Like the rest, the volume before us embodies both first-hand work on a wide range of sources and a close study of the very considerable secondary literature; one cannot wonder that three years have elapsed since the last instalment appeared. But the antiquarian scaffolding has been carefully cleared—*ars est artem celare*—the emphasis being far more on interpretation than on information, and as an interpreter the author is brilliant, with a metaphysical flair which unerringly elicits the big issues and leaves them not smothered but clarified by the supporting quotations and comments. There are summaries enough already, but of interpretations we can scarcely have too many when they come from a mind so fresh, so appreciative, and so surely critical as that of Professor de Ruggiero.

The volume begins with the dawn of the new physics, passes to Descartes and Spinoza, and concludes with the fortunes and misfortunes of Cartesianism in France and the Netherlands. The author rightly refuses to separate the new science and the new philosophy; both, he points out, are expressions of a single bias of thought, the turning away from quality to quantity and the consequent mechanism being not the result of the new researches but postulates of the method these were to follow—and a conception of a particular method is "a view of the world *in nuce*, a view implicit in the very orientation of the inquiry." The author consequently emphasizes the mechanistic strain in Descartes, Spinoza, and Malebranche. In the two latter this strain is, of course, more than counterbalanced by a dominant strain of mysticism, but in Descartes it is developed much more fully than the apparently idealistic strain; and I hoped that Professor de Ruggiero would say what his general view of the period suggests, namely, that a mechanistic account of nature was the goal towards which Descartes in his sceptical and theological preludes was laboriously hurrying—in other words, that Descartes embraced metaphysics only that he might find a warrant for siding with the new physics. But the author does show that he cannot endorse the tradition of the text-books, which makes of Descartes the father of modern idealism. Of course, Descartes happened to influence Locke, and Locke influenced Berkeley (who also came into more direct contact with Cartesianism through Malebranche), but the idealism that resulted from this line was the very one which Descartes believed he had refuted; and it is very doubtful whether the idealism of Hegel owed anything at all to Descartes.

Descartes is so well-worn a subject that it is a pleasure to find a freshly written account of him, one which owes its freshness not to any determination to be original but to sheer felicity of interpretation and expression. The general impression left is of the contrast between the clearness and distinctness which Descartes desiderated and the obscurities of his own system. Spinoza, however, is not a trite subject; the literature on him is smaller, and in the whole of it he is neither summed up nor worn threadbare. According

to Professor de Ruggiero, he has suffered much misunderstanding through being treated overmuch as a disciple, even with the concesssion that he was an independent disciple, of Descartes. Far from rising to monism through first an acceptance of Descartes's definition of substance and then a recognition of the inconsistency with this of conceiving mind and matter as substances, he was a monist by racial temperament and tradition, finding in Cartesianism not a new conception of things but a new method or instrument suited to give his own antecedent vision an ordered and cogent shape, though in taking over the method he naturally took over a few other things as well. The author holds that the roots of Spinoza's monism lay in the Neoplatonic tradition of the Middle Ages and of the Renaissance, and suggests further that the doctrine of parallelism may have come from the *Fons Vitae* of Avicebron. In consequence, he stresses a dynamic conception of Spinoza's God, as a cause unfolding itself in the attributes and modes rather than as a universal exhibiting its determinations; and he notes the affinity with both the pagan and Christian Neoplatonism of Spinoza's erection of God above thought and matter, reason and will, above all determinations whatever (though he observes also that when at the end of the *Ethics* the demands of our moral and religious nature come up for consideration, terms that imply personality creep in). The most general contrast, he says, between Descartes and Spinoza is that whereas the former tried, though very unsuccessfully, to break with tradition, the latter took up the content of the past in the hope of bringing it into the light of Cartesian evidence.

The preliminary chapter on Bacon, Kepler, and Galileo, and the concluding chapter on Cartesianism in France and the Netherlands, are models of relevant and sensitive statement. The bibliographies are carefully constructed and up to date. It is interesting to observe that on Bacon there is no reference to an English monograph except Broad's recent pamphlet, the foreign works being better as well as more numerous than ours. To the works on later Cartesianism should be added the important book by Professor Pierre Brunet, *L'introduction des théories de Newton en France au XVIII^e siècle* (Paris, 1931), which treats in great detail of the resistance and accommodation of the Cartesian physics to the ideas of Newton.

T. E. Jessop.

The New Psychology and Religious Experience. By Thomas Hywel Hughes, M.A., D.Litt., D.D. (London: George Allen & Unwin Ltd. 1933. Pp. 332. Price 10s. 6d.)

This volume is a competent, interesting, and valuable contribution to a living issue (one of the most important) of to-day; its title indicates its purpose: it is a vindication of religious experience (especially the Christian) against the assault upon its validity and veracity involved in the new psychology. It is well arranged, well written, and well documented. The scrutiny of the subject is penetrating, the exposition lucid, the criticism is always courteous, and the appreciation of what is good in any of the theories criticized is generous. There are a helpful Table of Contents, a full Bibliography, and a useful Index. The Introduction indicates the problem to be discussed. The first chapter describes the Basal Assumptions of the New Psychology in its two main forms—Behaviourism and Psycho-analysis; for the rest of the volume the second necessarily receives more attention than the first, which seems to me a freak which deserves only ridicule; it is mind "debunking" itself. Chapter II faces what is really the crucial issue: Is God reality, apprehended in the religious consciousness, or a projection of the

human mind, an objectification of what is only subjective? In Chapter III, the part assigned to the Instincts, especially that of Sex, in the Religious Life, by the New Psychology, is rejected, and religion is treated, not as an instinct, but as a sentiment. In Chapter IV, on the Religious Consciousness and Experience, criticism gives place largely to constructive exposition in disproof of the psychological theories which explain it by explaining it away. The author regards feeling as basal in the religious consciousness, and asserts the apprehension of reality in religious experience.

The discussion in Chapter V of the Consciousness of Sin, including the development of conscience, brings out the sharp antithesis of these theories to moral convictions and religious assurances. The account of Conversion given by the New Psychology is, in Chapter VI, rejected as inadequate, and especially in its exclusion of the objective factor—God. I found Chapter VII especially attractive; this deals with the content of the religious consciousness, the sense of peace, the consciousness of power, and the sense of a Divine Presence. The last chapter deals specifically with the treatment of Christianity in the New Psychology, although the previous discussion of the religious consciousness was implicitly from the distinctively Christian standpoint. This chapter includes a very generous appreciation of Jung's understanding of many features in Christianity, although his view of it as a mythology is rejected.

As one followed the author's clear and fair exposition of psychological theories, one was forced to ask: Can psychology claim to be a science, when the data are so arbitrarily manipulated, when the personal equation so offensively obtrudes itself, when such a devaluation of moral and religious values results? It is a relief and comfort to know that this New Psychology does not receive the support of many competent psychologists, who respect man's mental capacity, his moral conscience, his religious consciousness, and do not seek to reduce him to the measure of a senseless, stupid, corrupt, and superstitious brute. For one who is rooted in the Christian values most of these theories must appear as irrelevant ignorance, the blind denying the existence of colour, or the deaf of sound. "The secret of the Lord is with them that fear Him." "Spiritual things are spiritually discerned." Nevertheless, one must be grateful to an author who takes such pains to expose to human reason the false pretensions of this New Psychology to be a science, and not an irrational propaganda.

A few comments on points of divergence of judgment regarding either substance or expression may be added. I do not think it wise to seek a support for the belief in man's liberty in the principle of indeterminacy in physics (p. 84). I regret that the writer follows McDougall in the loose use of the term instinct, and thus has to raise the question whether there is a "religious instinct" (pp. 116 ff). The discussion as regards *fear* as the religious motive seems to me too abstract; surely man's reaction to the world will depend on whether it offers good or threatens ill to him (p. 136). It seems to me a mistake to describe morality as "instrumental," since moral goodness is not merely a means to an end, but an essential element in the good itself (p. 150). To describe God as "a personality" is to treat the One from whom are the many, as if He were one of the many (p. 151, *cf.* p. 282). Can feeling be the basal element, since it must be in relation to awareness of an object, a rudimentary intellectation? (p. 156). What is said on God's Knowledge as intuition seems to me inadequate. If the world have even *relative* reality for God, His Knowledge of events in time must involve that temporal succession has some reality for Him (p. 165). As it is uncertain whether "acquired characters" can be inherited, I am doubtful if we can give any modern meaning

to the doctrine of original sin (p. 189). Man's distinctively human endorsement makes the dominance in him of animal appetites or impulses not merely natural, but abnormal, and that endowment should through the human environment (the social inheritance) be affected for good or ill before conscious choice begins. Consciousness of sin before it develops as "an individual experience" may in my judgment be regarded as "a social fact," as a vague uneasiness as regards a disturbed relation to others (p. 204). In regard to conversion I should not allow myself the use of such a phrase as "supernatural interference" (p. 218) or "divine interposition" (p. 233) as deistic in import. I cannot see how in any experience the emotional and conative, and not the intellectual can be primary, since emotion and conation must be directed to an object apprehended (p. 223). As far as my memory serves me, Socrates' "daemon" was a restraining and not an impelling influence (p. 262). The statement on p. 269 regarding the passage of suggestion from one mind to another does not guard itself against appearing as a revival *occasionalism*. I am not convinced that an isolation of "the effort of the will" is psychologically sound (p. 274). Does not the direction of the will depend on the concentration of the attention, the absorption of the emotions in an object? The statement about mysticism seems to be inadequate, as it does not discuss the abnormal psychic conditions of visions and voices which mystics have regarded as aids to the realization of the presence of God (p. 287). Let my last comment be one of cordial agreement with the brief reference to Christology (p. 317), as I hold with the author that the divine immanence in man does not account for the uniqueness of Christ, but we must also recognize transcendence. These comments are no depreciation of the volume, but an indication of the close scrutiny I have given to it and the keen interest which it has awakened.

ALFRED E. GARVIE.

The Quest of Reality—An Introduction to the Study of Philosophy. By the Right Rev. Monsignor WALSHE, M.A. (London: Kegan Paul, Trench, Trübner & Co. 1933. Pp. xix + 594. Price 15s.)

"A youthful aspect cannot always be recaptured by age," remarks the author; yet about *The Quest of Reality* there is a vigour and a picturesqueness which would belie the words, did not the work also attest wide reading and deep reflection. It is a picture gallery, hung with vivid portraits of various sizes, portraits at once of philosophers and philosophies, interspersed with pictures of another kind, a monument to the memory of Augustine, a map of Athens, a ferry crossing the Maeander to Miletus, the relics of St. Thomas above an altar. A third of the book is devoted to ancient philosophy, of which the author gives a lucid and critical account. Modern philosophy occupies another third. It begins with Descartes, includes all the great names, and ends with a sketch of the various forms of philosophy which have appeared in recent years, and an appreciation of their value from the author's standpoint, which is that of a Thomist. The middle portion comprises two large portraits, those of Augustine and Aquinas, and a lot of miniatures. One could wish that it had been longer, that the author had made more than a passing reference to the vigorous quest for reality carried on by Abelard, by the Chartres school, and by the Victorines of the twelfth century, that he had told us more of the standpoint of Bonaventure and the Augustinians, of the Aristotelianism of Duns Scotus, of the modifications introduced by Suarez and other Scholastic writers. He seems to recognize but two great Scholastics, St. Augustine and St. Thomas Aquinas, and from his account

of them one would scarce gather that the innovations of Brother Thomas in the thirteenth century constituted a revolution no less significant than those of Copernicus or Kant.

The Quest of Reality is a curious and striking book, and it ends in a curious way. On the cover we are assured that the quest has not been in vain, that three important results emerge: the certainty of a large measure of philosophical principles; the recognition that Truth, Beauty, and Goodness, as manifested in created things, are due to Divine Immanence; and the reasoned conclusion that God, in His transcendent Being, is the source and origin of all perfection. The results at which the author himself arrives, however, in his last chapter, entitled "The Attainment of the Quest," are very different. Instead of discussing whether truth has emerged from his long and laborious quest, he turns with relief "from the conflicting opinions of philosophers to the 'golden wisdom' of St. Thomas." This he proceeds once again to recapitulate, but ends with a shrug of the shoulders. "The true moral of the tale," he says, "is expressed in the well-known words: 'If you continue in My word, you shall be My disciples indeed, and you shall know the truth, and the truth shall make you free.' " From St. Thomas he has turned to Augustine and Anselm. There can be no true philosophy apart from revelation. *Si non credideritis, non intelligetis.*

LESLIE J. WALKER.

The Universe and Life. By H. S. JENNINGS, Henry Walters Professor of Zoology and Director of the Zoological Laboratory, The Johns Hopkins University. (New Haven: Yale University Press. London: Humphrey Milford: Oxford University Press. 1933. Pp. 94. Price 7s. 6d. net.)

This little volume embodies the tenth series of the Terry Lectures at Yale on "Religion in the Light of Science and Philosophy." Professor H. S. Jennings, the distinguished biologist, was chosen to deliver them, and he sets out "to show what positive outlook on the world is given by the study of biological science, and how this differs, if at all, from the outlook based on physics, or from the outlook presented in some of the religions of the world." The lectures are written in an admirably lucid style and are commendably free from technical terms.

Professor Jennings begins by rejecting without hesitation the over-simplified biology of those who attend only to the outer or physical aspects of life, and he insists on including the inner or mental data as well. Life is, for him, an emergent with new qualities which could not have been foretold from a knowledge of things at the physico-chemical level. Behaviourists and others notwithstanding, the mental factor in life is not a mere epi-phenomenon. In the causation of events by living creatures it is impossible to isolate the mental from the physical, and therefore it is unscientific to conclude that the mental plays no part. As against a widespread notion that science is only possible on mechanistic assumptions, the view is taken that all that is necessary for science is "that events depend on conditions." As these conditions change with the emergence of the unpredictable, in a "Universe which is not given complete once for all" (p. 30), Science, even if omniscient with respect to the past, would have to confess ignorance with respect to the future. Has life a predetermined goal? Is it controlled by an over-ruling purpose? "So far as biological science can see, there is no indication of the previous existence of a prototype, a final goal toward which life is tending" (p. 62). Also, "every indication that might be sought of a guidance of life towards a pre-existing goal is lacking" (p. 63). The argument from contrivance to con-

triver is dismissed as involving an infinite regress which "gets us nowhere" (p. 64). It may be pointed out, however, by way of criticism that a theistic philosophy should be taken as a whole, and that no infinite regress is involved when it postulates an eternal self-sufficient Being as the Ground of the world. Such a philosophy, moreover, it may be contended, by its acknowledgment of the non-temporal, gives a more adequate description of the universe than the doctrine of creative emergence, which Professor Jennings takes as the last word about the mystery of the cosmos.

In the third and closing chapter on "The Management of Life," morality, value in general, and human destiny are discussed. The biological basis of all values should, it is urged, be kept in mind, otherwise the subject becomes infected with unreality. Morality needs no authority outside itself—altruism, for example, has a natural basis—and moral codes should be frequently revised to meet the needs of life. Life's needs, in this philosophy, would be given a very wide range, but though Professor Jennings would include the idealist's absolute values, Beauty, Truth and Goodness, among biological values, he would think some of the conclusions as to human destiny drawn from man's enjoyment of such values unsound. Neither in this region nor elsewhere is there "evidence of the sort required for establishing the verifiable relations accepted in science that the individuals who have died still live as such in some other condition" (p. 87). To make the inference, however, from such conclusions as these that life is not worth living or that right and wrong have lost their meanings, we are told, would be unwarranted. Right is what promotes, and wrong what hinders, life. Life is good in itself, and interest in the future progress of the race can happily replace interest in one's own immortality.

Professor Jennings does not allow himself to overlook the failures of life, and for that reason his readers are more likely to think that the closing words of his book, though optimistic, are well grounded. "Life . . . is progressing in the present as it has in the past. In the future it may be expected to advance as it has done in the past—to heights that no one can predict, to which no one can set limits."

A. E. Elder.

Ajñāna. (Calcutta Oriental Series, 26.) By G. R. Malkani, R. Das, and T. R. V. Murti. (London: Luzac and Co. 1933. Pp. iii + 226. Price 10s. 6d.)

These three essays, independently written, one by each author, are apparently the outcome of discussions held at a certain Indian Institute of Philosophy. All three hold, that on the proper interpretation of 'Not-Knowing' the understanding of the Vedântic system, *i.e.* early mediaeval Indian metaphysic, mainly depends. The essays are named respectively, Nescience (Ajñāna), The Theory of Ignorance in Advaitism (Monism), and again, Ajñāna. The essayists have a good mastery of lucid English, and show acquaintance with British philosophic classes, such as Hume and Berkeley, and with modern British thought, such as the realism of S. Alexander, but not with European classic philosophy, either ancient or modern. Allusion to any Western thought is very slight. This is not said to underrate their concentration on Indian tradition, but in order to tell the reader what he will not find. Neither will he find historical treatment in any one of the three. But then that is never a metaphysician's strong point. For him it does not much matter where and when the thinker he takes as typical lived. *E.g.*,

page 190, "The Buddhist" is a work or a man referred to as Chitsukhi; now who, or what, or *when* was Chitsukhi? But the work will repay reading, if only to compare this negative datum of metaphysic with more positive starting-points.

C. A. F. Rhys Davids.

Eastern Philosophy for Western Minds: An Approach to the Principles and Modern Practice of Yoga. By Hamish Maclaurin. With a Preface by Major F. Yeats-Brown. (Boston, U.S.A.: The Stratford Co. 1933. Pp. xii +282. Price $2.50.)

In the two parts of this book, The Ancient Aryan Teachings and The Practice of Yoga (it is claimed there are three parts), I see a certain advantage in the American reader's possible complacency in Western achievement being castigated by other-world and other-time achievement, but I lay the volume aside with the truth of Pope's line made truer: "a little learning is a dangerous thing." We read much about Vedic 'writings,' Vedic 'experimenters,' Vedic 'contentions.' But never a word of exact reference to vindicate it all; never a sign of living gurus in the picture, who tell us this and that. We are wandering in a Cloud-cuckoo-town. And whereas the chief lesson of Indian thought is to show us the More that there is in the Man—the very Man, not his body or mind—the religious philosophy of the author does but give us a materialistic conception of a Man-in-the-Less. Major Yeats-Brown has some useful criticism in his preface, and, in his advocating "a feeling-realization of unity with the worlds visible and invisible," reveals implicitly a great defect in a book on "Aryan wisdom," to which the worlds invisible were as real and as near as the author makes them unreal and of no account. But that the former should endorse the materialistic picture of reincarnation, and call a tribunal after death "preposterous," when it is the most rational event, as man's "next step," that can be imagined, is a surprise.

C. A. F. Rhys Davids.

Books received also:—

J. H. Badley. *The Will to Fuller Life.* London: George Allen & Unwin Ltd. 1933. Pp. 282. 10s. 6d.

J. W. Friend and J. Feibleman. *Science and the Spirit of Man. A New Ordering of Experience.* London: George Allen & Unwin Ltd. 1933. Pp. 336. 12s. 6d.

Various. Ed. E. L. Schaub. *Spinoza, the Man and His Thought.* London & Chicago: The Open Court Co. 1933. Pp. vi + 61. 3s. 6d.

Various. *Proceedings of the Aristotelian Society,* 1932–33. London: Harrison & Sons Ltd. 1933. Pp. 354. 25s.

G. R. Heyer, M.D. (Translated E. & C. Paul). *The Organism of the Mind. An Introduction to Analytical Psychotherapy.* London: Kegan Paul, Trench, Trübner & Co. 1933. Pp. xi + 271. 15s.

A. Korzybski. *Science and Sanity. An Introduction to Non-Aristotelian Systems and General Semantics.* Lancaster, Pa., and New York: International Non-Aristotelian Library Publishing Co. 1933. Pp. xx + 798.

C. E. Playne. *Britain Holds On, 1917, 1918.* London: George Allen & Unwin Ltd. 1933. Pp. 440. 15s.

A. H. J. KNIGHT. *Some Aspects of the Life and Work of Nietzsche, and particularly of his connection with Greek Literature and Thought.* London: Cambridge University Press. 1933. Pp. 194. 10s. 6d.

A. S. PRINGLE-PATTISON, LL.D., D.C.L. (Edited with Memoir by G. F. Barbour, Ph.D.). *The Balfour Lectures on Realism.* Edinburgh and London: W. Blackwood & Sons. 1933. Pp. x + 258. 7s. 6d.

M. OAKESHOTT. *Experience and its Modes.* London: Cambridge University Press. 1933. Pp. viii + 359. 15s.

E. SCHNEIDER. *The Aesthetics of William Hazlitt. A Study of the Philosophical Basis of His Criticism.* Philadelphia: University of Pennsylvania Press. London: Oxford University Press: Humphrey Milford. 1933. Pp. viii + 200. 8s. 6d.

W. W. TARN. *Alexander the Great and the Unity of Mankind.* (Raleigh Lecture 1933.) London: Humphrey Milford. 1933. Pp. 46. 2s. 6d.

S. DASGUPTA, Ph.D. *Indian Idealism.* London: Cambridge University Press. 1933. Pp. xxiii + 206. 10s. 6d.

C. A. MACE. *The Principles of Logic. An Introductory Survey.* London: Longmans, Green & Co. 1933. Pp. xiii + 388. 12s. 6d.

J. C. FLUGEL. *A Hundred Years of Psychology.* London: Duckworth & Co. 1933. Pp. 384. 15s.

F. G. CROOKSHANK, M.D., F.R.C.P. *Individual Psychology and Nietzsche.* London: The C. W. Daniel Co. 1933. Pp. 76. 2s. 6d.

C. R. MORRIS, M.A. *Idealistic Logic. A Study of its Aim, Method, and Achievement.* London: Macmillan & Co. 1933. Pp. ix + 338. 12s. 6d.

S. ALEXANDER, O.M., Litt.D., F.B.A. *Beauty and Other Forms of Value.* London: Macmillan & Co. 1933. Pp. x + 305. 10s. 6d.

S. ZUKERMAN, D.Sc., M.R.C.S. *Functional Affinities of Man, Monkeys, and Apes.* London: Kegan Paul, Trench, Trübner & Co. 1933. Pp. xviii + 203. 10s. 6d.

W. GALT, M.A. *Phyloanalysis. A Study in the Group or Phyletic Method of Behaviour-Analysis.* (Preface by T. Burrow, M.D.) London: Kegan Paul, Trench, Trübner & Co. 1933. Pp. 151. 2s. 6d.

COMMANDER B. T. COOTE. *Scheme of National Training for Leadership in Leisure Activity.* (Foreword by L. P. Jacks, D.D., LL.D., D.Litt.) Published by the author at Send, Surrey. Pp. 6. 6d.

C. RITTER. (Translated A. Alles.) *The Essence of Plato's Philosophy.* London: George Allen & Unwin Ltd. 1933. Pp. 413. 16s.

C. E. M. JOAD. *Counter Attack from the East.* London: George Allen & Unwin Ltd. 1933. Pp. 269. 7s. 6d.

H. DRIESCH. (Translated T. Besterman.) *Psychical Research.* Foreword by Sir O. Lodge. London: G. Bell & Sons. 1933. Pp. xvi + 176. 5s.

S. M. STINCHFIELD, Ph.D. *Speech Disorders. A Psychological Study of the Various Defects of Speech.* (International Library of Psychology, Philosophy, and Scientific Method.) London: Kegan Paul, Trench, Trübner & Co. 1933. Pp. xii + 341. 15s.

C. LLOYD MORGAN, D.Sc., LL.D., F.R.S. *The Emergence of Novelty.* London: Williams & Norgate Ltd. 1933. Pp. 207. 7s. 6d.

E. E. KELLETT. *A Short History of Religions.* London: Victor Gollancz Ltd. 1933. Pp. 607. 7s. 6d.

A. G. GIBSON. *The Physician's Art. An Attempt to Expand John Locke's Fragment 'De Arte Medica.'* Oxford at the Clarendon Press: Humphrey Milford. 1933. Pp. 237. 7s. 6d.

R. V. FELDMAN, M.A. *The Concept of Self-Respect, and its Significance for Jewish Theology.* London: E. Goldston Ltd. 1933. Pp. 16.

L. J. A. Mercier. *The Challenge of Humanism.* New York and London: Oxford University Press: Humphrey Milford. 1933. Pp. vi + 288. 10s. 6d.

R. G. Collingwood. *An Essay on Philosophical Method.* Oxford at the Clarendon Press. London: Humphrey Milford. 1933. Pp. xii + 226. 10s.

M. Black. *The Nature of Mathematics. A Critical Survey.* (International Library of Psychology and Philosophy.) London: Kegan Paul, Trench, Trübner & Co. 1933. Pp. xiv + 219. 10s. 6d.

W. Burridge, D.M., M.A. (Foreword by Sir L. Hill.) *A New Physiological Psychology.* London: Edward Arnold & Co. 1933. Pp. vi + 158. 7s. 6d.

G. P. Conger, Ph.D. *The Horizons of Thought. A Study in the Dualities of Thinking.* Princeton: Princeton University Press. London: Oxford University Press: Humphrey Milford. 1933. Pp. x + 367. $5; 22s. 6d.

S. Radhakrishnan. *East and West in Religion.* London: George Allen & Unwin Ltd. 1933. Pp. 146. 4s. 6d.

A. D. Nock. *Conversion: The Old and New in Religion from Alexander the Great to Augustine of Hippo.* London: Oxford at the Clarendon Press: Humphrey Milford. 1933. Pp. xii + 309. 15s.

Ugo Spirito. *Scienza e Filosofia.* Firenze: G. C. Sansoni. 1933. Pp. 155. L.12.

Galvano della Volpe. *La Filosofia dell'esperienza di Davide Hume.* Firenze: G. C. Sansoni. 1933. Pp. ix + 191. L.30.

G. E. Barié. *La Spiritualità dell'essere e Leibniz.* Padova: Dott. Antonio Milani. 1933. Pp. vi + 553. L.57.

E. Grassi. *Dell'apparire e dell'essere.* Firenze: La Nuova Italia. 1933. Pp. 96. L.6.

G. Galli. *Saggio sulla Dialettica della Realtà Spirituale.* 1. *I problemi fondamentali.* Roma: Società Anonima Editrice Dante Alighieri. 1933. Pp. viii + 277. L.25.

U. A. Padovani. *Arturo Schopenhauer. L'Ambiente, La Vita, Le Opere.* Milano: Società Editrice *Vita e Pensiero.* 1934. Pp. x + 214. Lire quindici.

Various. *Spinoza. Nel Terzo Centenario della sua Nascita.* Milano: Società Editrice *Vita e Pensiero.* 1934. Pp. v + 210. Lire dodici.

Dictionnaire de Spiritualité. Ascétique et Mystique. Doctrine et Histoire. Fascicule 11. Allemande (Spiritualité)—Anglaise (Spiritualité). Publié sous la direction de Marcel Viller S. J. Paris: Gabriel Beauchesne et Fils. 1933. Pp. 322–639. 20 frs.

R. Déjean, D. ès L. *L'émotion.* Paris: Librairie Félix Alcan. 1933. Pp. viii + 261. 35 frs.

R. Déjean, D. ès L. *La Perception Visuelle: Étude Psychologique de la Distance: les Conditions Objectives.* Paris: Librairie Félix Alcan. 1926. Pp. 168.

Œuvres de Jules Lachelier. Paris: Librairie Félix Alcan. 1933. Tome 1. Pp. xlv + 219. Tome 2. Pp. 224. Les 2 tomes ensemble 80 frs.

Various. *Septimana Spinozana. Acta Conventus Oecumenici in memoriam Benedicti de Spinoza diei natalis treçentesimi Hagae Comitis habiti.* The Hague: Martinus Nijhoff. 1933. Pp. xii + 321. 8 guilders (Buckram 9.50 guilders).

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INSTITUTE NOTES

LENT TERM begins on January 9th and ends on March 22nd. The following courses of lectures have been arranged for the Lent Term of the Session 1933–34:—

"THE PHILOSOPHY OF RELIGION," a course of six weekly lectures by O. S. Franks, M.A. (Fellow and Praelector of The Queen's College, Oxford), on Fridays at 5.45 p.m., at University Hall, 14 Gordon Square, W.C.1, beginning February 2nd. Fee for the course, 12s. 6d. Members free.

"SOVEREIGNTY, FREEDOM, AND THE STATE," a course of six weekly lectures by W. A. Pickard-Cambridge, M.A. (of Worcester College, Oxford), on Tuesdays at 5.45 p.m., at University Hall, 14 Gordon Square, W.C.1, beginning January 23rd. Fee for the course, 12s. 6d. Members free.

The Evening Meetings for the Lent Term will be held at University College, Gower Street, W.C.1, at 8.15 p.m., on the following dates:—

January 16th: "Traditional Morality and Modern Life." Professor W. G. de Burgh.

February 13th: "Determinism, Indeterminism, and Freedom." C. D. Broad, M.A., Litt.D.

March 13th: "Science, Philosophy, and Religion." The Dean of St. Paul's.

NOTICE CONCERNING THE PUBLICATION OF A NEW JOURNAL *ANALYSIS*

It is proposed to publish for the first time in November 1933 and three times more in the course of a year, a new philosophical journal under the title of ANALYSIS. The Journal will consist, as a rule, of very short contributions, each so far as possible confined to a single point, in which philosophical questions will be discussed from a logical or analytical point of view. The journal will be edited by Mr. A. E. Duncan-Jones, in co-operation with

Professor L. Susan Stebbing, Mr. C. A. Mace, and Mr. G. Ryle; these persons were chosen as a committee by a larger group of people interested in the project of such a journal. The proposal for such a journal also has the support of Professor R. I. Aaron, Mr. R. B. Braithwaite, Professor C. D. Broad, Professor G. Dawes Hicks, Professor A. J. Dorward, Mr. A. C. Ewing, Professor G. C. Field, Professor A. E. Heath, Mr. C. E. M. Joad, Professor J. Laird, Professor G. E. Moore, Mr. H. H. Price, Mr. W. D. Ross, Professor L. J. Russell, Professor G. F. Stout.

The editor and committee will aim at conducting ANALYSIS in such a way as to illustrate subjects of current philosophical interest, and to furnish philosophers in different places with a means of communicating their conclusions and reflections to one another. Discussion will be encouraged; and the delay between submission of contributions and publication of accepted matter will be as short as possible. It is intended sometimes to publish, in whole or in part, papers which have been read before philosophical societies in the universities, and which have aroused special interest.

The price of each issue of ANALYSIS will be One Shilling, post free to those subscribing for the first four numbers. It will be published by Basil Blackwell, Broad Street, Oxford.

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THE BRITISH INSTITUTE OF PHILOSOPHY

The Institute has no endowments, and its work, which includes Lecture Courses and Study Circles in the various Centres as well as the conduct of the Journal, is carried out on the most economical lines, but it cannot be expected that a liberal service be provided entirely from revenue derived from subscriptions at £1 1s. per annum.

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